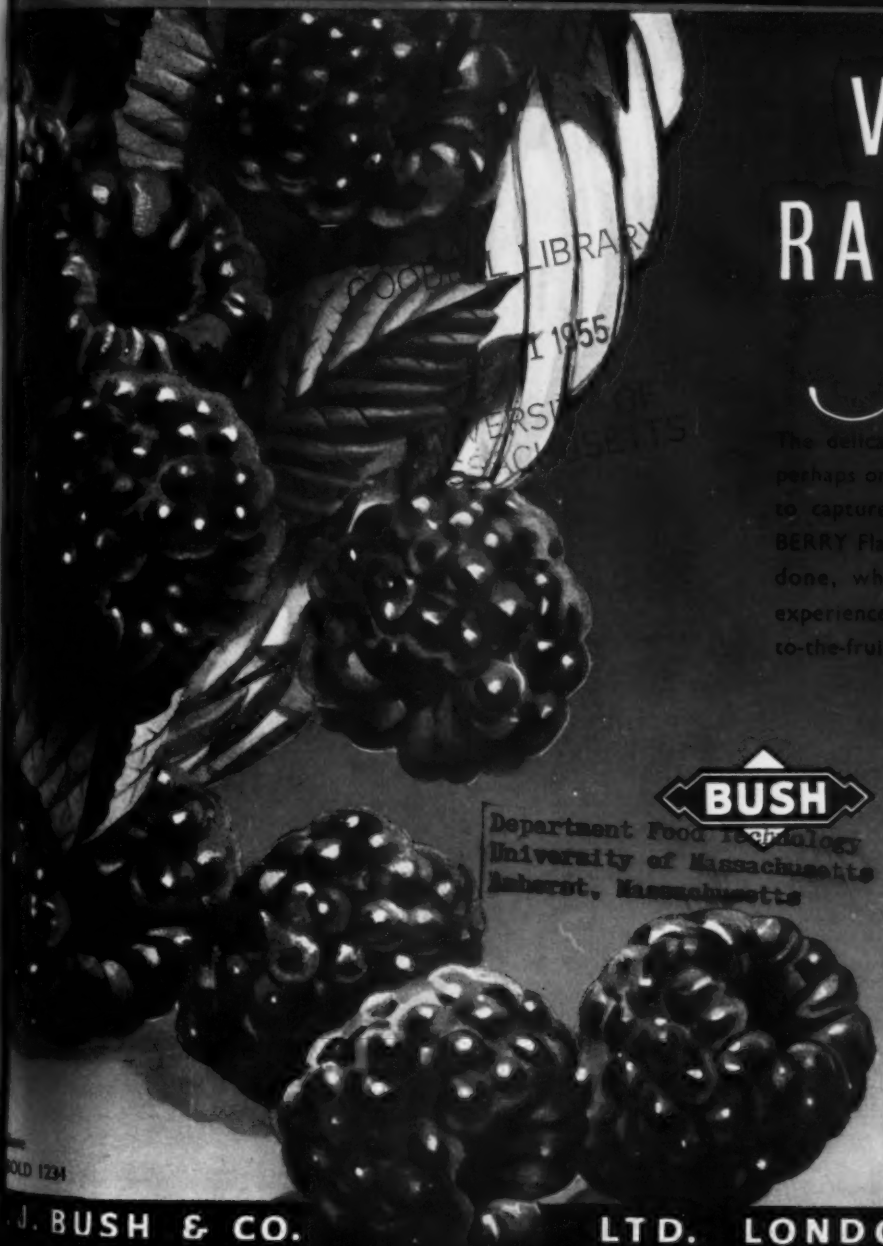
FOOD MANUFACTURE

Incorporating Food Industries Weekly

ARD HILL LIMITED, STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1 30:11 NOVEMBER 1, 1955



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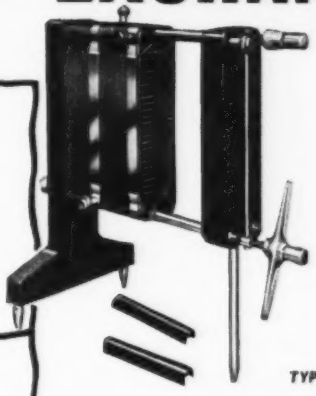

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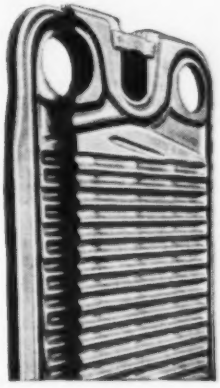

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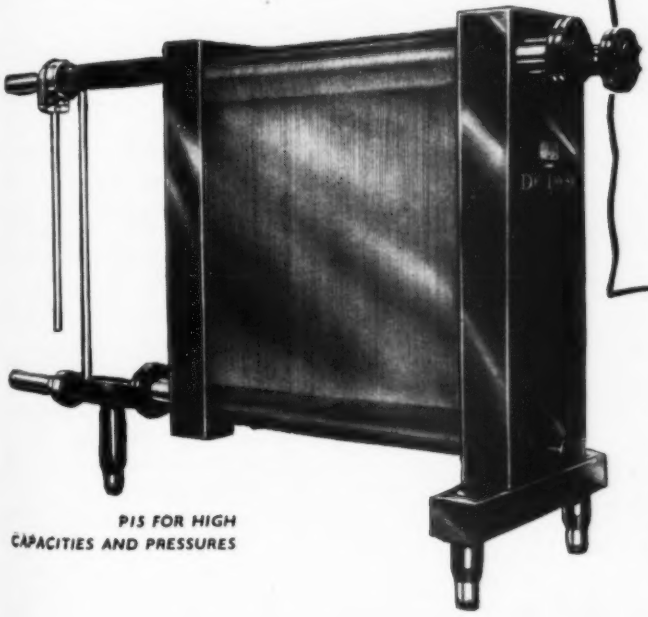

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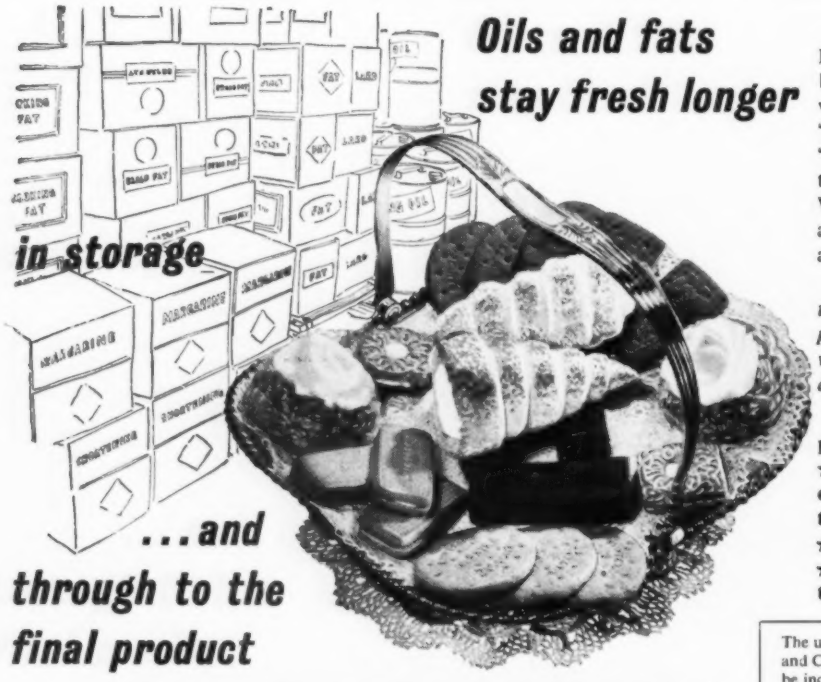

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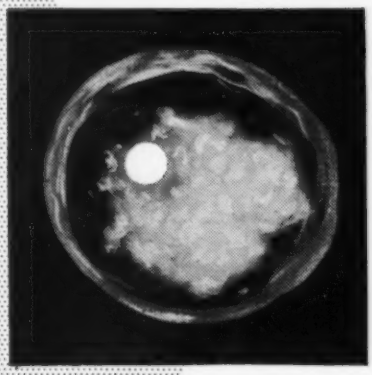
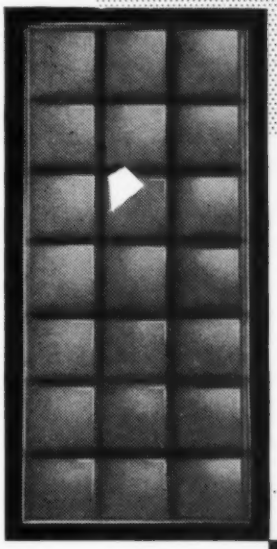
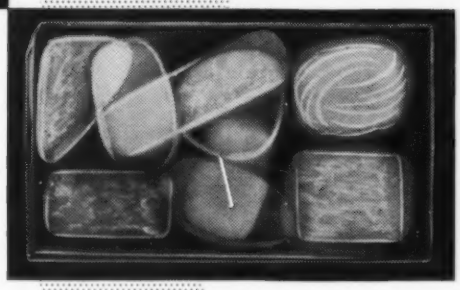


X-ray view of a button in pork pie



X-ray view of a piece of razor blade in bar of chocolate



X-ray view of a pin in chocolate in box of chocolates

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A Dunlop Company

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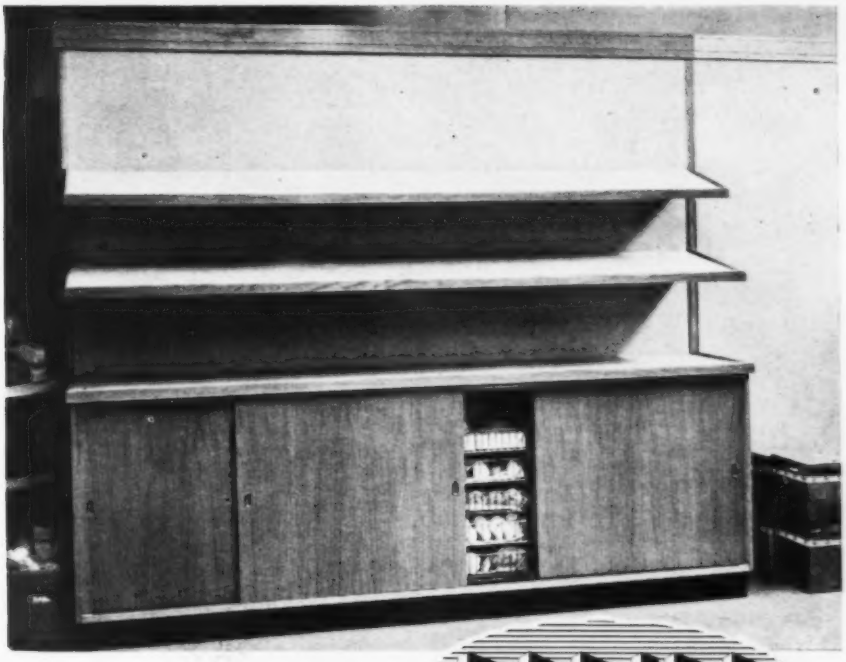

Be right with BERITE

PLASTIC FACED BOARD

THE AMAZING NEW PLASTIC FACED BOARD AT HALF THE PRICE

Illustration above by kind permission of Messrs. T. C. Williams & Son Ltd., 83 Newfoundland Road, Bristol 2, showing one of their standard units designed for the bakery and confectionery trade. Made in BERITE and polished Oak, with detachable shelves and back.

BERITE can be cut, worked, drilled, nailed and screwed with ordinary tools, and its convenient thickness ($\frac{1}{2}$" or $\frac{3}{4}$") saves plywood bonding, etc.

BERITE is washable, resistant to heat, alcohol and water: and can be cleaned by merely wiping.

BERITE is ideal for shops, fittings, counters, bars, canteens, etc., and the price, to the best of our knowledge, far cheaper than any comparable material on the market today.

In five linen pattern shades:
PINK, BLUE, GREY, GREEN or BUFF.
—and Berlam, a plastic finished sheet, is obtainable separately —again at exceptionally moderate prices.

Stock size sheets 8' × 4' and 4' × 4' from your merchants and stockists.

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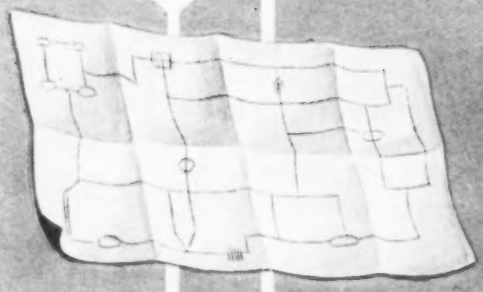
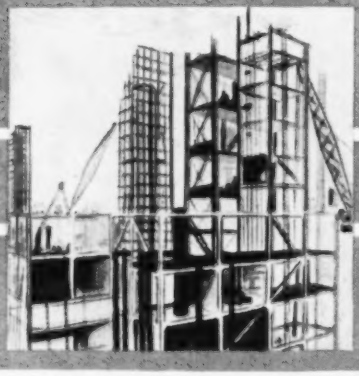
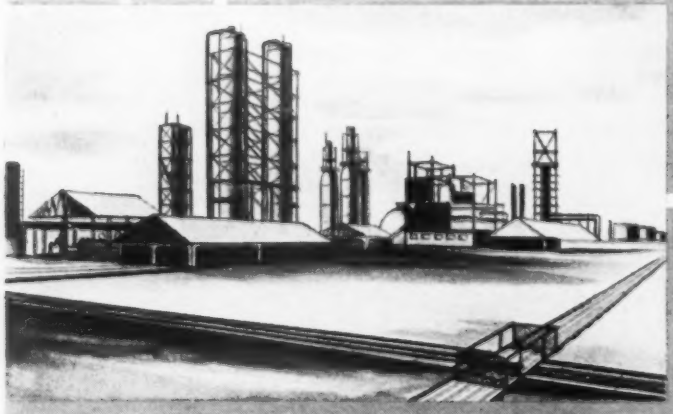
That crystallizes the Coniston service . . . providing the most efficient plant to meet manufacturing requirements. The organisation is founded upon the combined experiences of specialist engineers in the Chemical, Petroleum and Mechanical industries, backed by extensive operating knowledge. If it is a small pilot plant or a large scale project, Coniston provide detailed, meticulous attention to every aspect and precise co-ordination of all contract work —process planning, architectural design, erecting and organising.







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A MULTI-PURPOSE MACHINE THAT HAS PHENOMENAL OUTPUT . . .

feed and delivery capacity of 120 1-lb. jars per min.

Here is a machine with outstanding performance that has been specially designed for faster production in the Finishing Departments of Jam Factories. It is a four-purpose machine, fully automatic in action and equipped to give continuous production flow with minimum operator attention. The feed system is so designed that the heat temperature of the jars coincides with that of the water temperature, thus preventing deterioration of the preserves.

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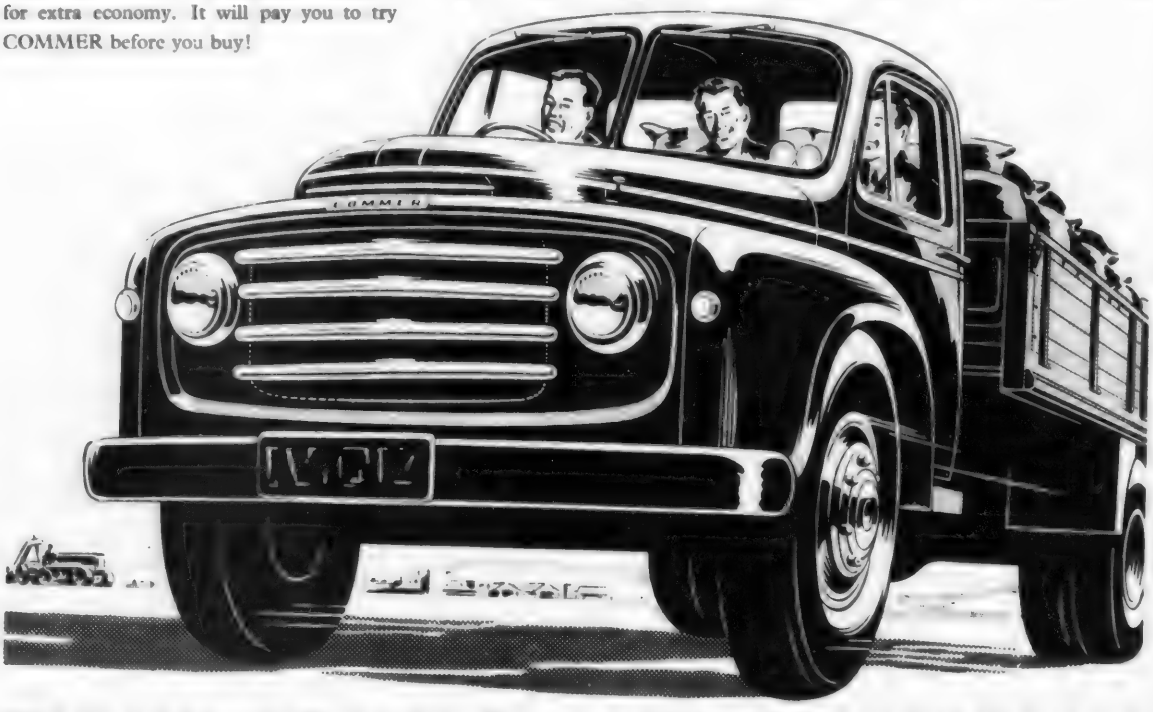
2-5 TON PETROL AND DIESEL TRUCKS

DESIGNED for economy, built for reliability, the new range of Commer 2-3, 3-4 and 5 ton trucks embody insulated three-seater cabs of welded steel. New steering and improved suspension add to the merits of a well-proved chassis; a range of factory-built bodies containing a high proportion of steel is offered, as well as an optional overdrive for extra economy. It will pay you to try COMMER before you buy!

WITH 'FULL-VIEW'
3-SEAT COMFORT CAB
& OPTIONAL OVERDRIVE



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GREAT-GRANDFATHER SPEAKS HIS MIND

" So they're calling me a wasteful old spendthrift. . . "

Should we blame Great-Grandfather, or ourselves, if we find that the old boy's methods are now expensive and out of date?

PROCEEDING, GREAT-GRANDFATHER SAID:

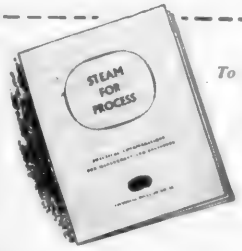
"In my day coal was a raw material costing ten shillings a ton, best quality and as much as I wanted. Maybe we did waste it—it was cheap enough—but I never used to waste any of my raw materials that cost real money. Like you are doing now, m'boy, if you're still using my steam plant or process steam methods.

Don't blame *me* if you're behind the times. At six pounds a ton, or whatever fancy price you pay for coal, I'd even be thinking of burning oil and I'd certainly have Spirax look at my process steam plant."

SPIRAX-SARCO STEAM CONTROL

PIRAX-SARCO LTD., CHELTENHAM, Glos. *Phone: Cheltenham 5175-76* *Grams: Spirax, Cheltenham*
LONDON OFFICE: 28 Victoria Street, S.W.1. *Abbey* 6101-3832

REQUEST SLIP FOR FURTHER INFORMATION



To SPIRAX-SARCO LTD., CHELTENHAM, Glos.

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Reduced heat fatigue increased production at

JACOB'S (L'POOL) LTD.

UNNECESSARY FATIGUE and loss of production were caused by radiant heat and excessively high air temperatures in the Wafer Department at W. & R. Jacob & Co. (L'pool) Ltd. Colts were consulted and a detailed ventilation survey proved that whilst more than sufficient extract ventilation already existed, this was unable to function properly owing to inadequate inlet air supplies. Five Colt Inflow Units were recommended as these would supply the inlet air necessary whilst at the same time the main cooling effects of the air movement provided would off-set the discomfort caused by radiant heat.

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FREE MANUAL with full specifications of the wide range of Colt Ventilators is available on request from Dept. S38/270

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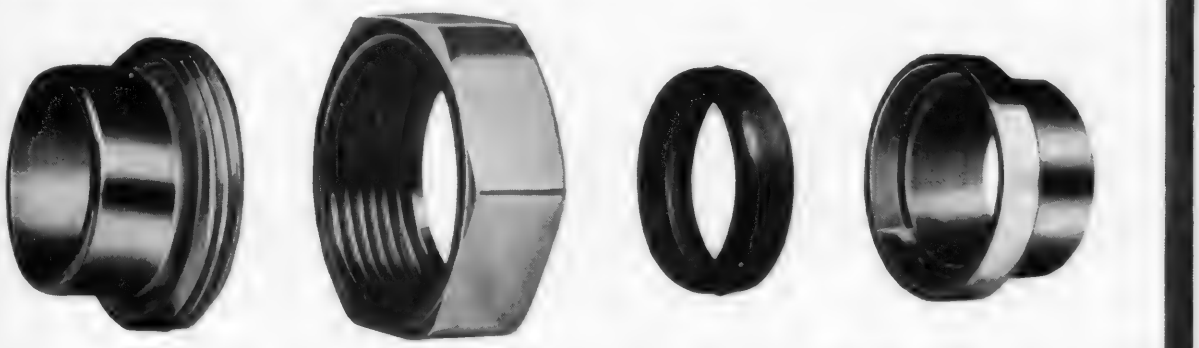
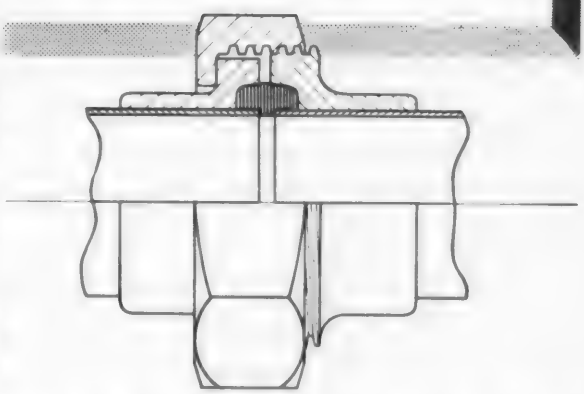
Forgotten Fittings



These CB TS type fittings represent a big step towards the perfect pipeline. They are so designed that the whole assembly is completely free of any crevice. So in-line sterilization can be done — no need to strip down the pipe systems. And if it is necessary to take down a section no tools are required because these new fittings need only to be hand tight.

The CB TS range of fittings includes unions, bends, tees, reducing bends and liners, blank caps and plug cocks. They are available in the following o.d. dimensions: 1″, 1¼″, 1½″, 2″, 2½″ and 3″.



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'ENGLISH ELECTRIC' ¾ *h.p. MY5123 f.h.p. motors with 'Opperman' gears driving 'Baker Perkins' dough conveyor and return tin conveyor at Messrs. Bilsland Bros. bakery in Glasgow.*

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f.h.p. motors

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WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

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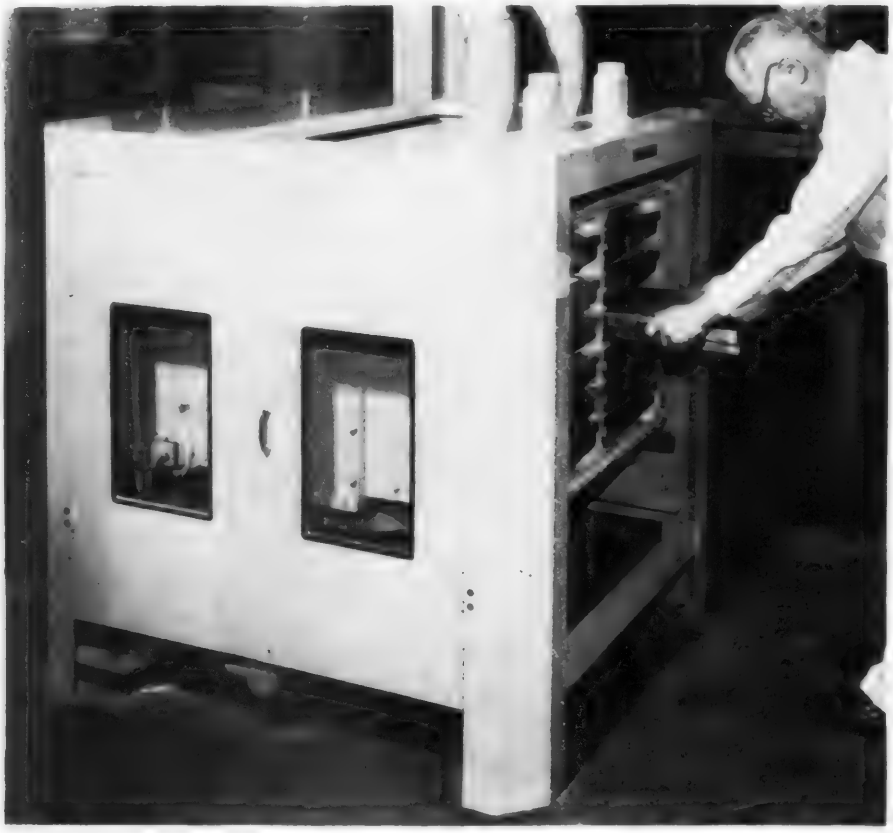

The Simon Junior Sifter has grown to be a big name in the food and confectionery world. This less-than-four-feet-square machine is now screening, grading and sifting flour, cocoa, starch, icing sugar, etc., in plants all over the country. The persuasive rotary motion of the horizontal sieves gives a gentle but positive separation of powders and granular materials, with throughputs up to three tons per hour. Its totally enclosed metal body means absolutely dust-free operation. Interchangeable aluminium trays and easily removed "drawer-type" sieves add to Junior's efficiency and simplicity.

- Low power consumption—a ½ h.p. motor is usually sufficient.
- Takes up little floor space.
- Easily changed internal flow for different separations.
- Simple to instal and maintain.
- Tough, durable Rotatubes replace textile sleeves—make perfect, dust-tight outlets.

Products handled include:

- **Synthetic Vitamins**
- **Custard Powder**
- **Moulding Starch**
- **Starch & Dextrines**
- **Cocoa**
- **Flour**
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Send now for the free Simon Junior Sifter folder

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for CAKES, BISCUITS and WAFERS

Edicol Supra Colours meet the highest standards of purity demanded by the most stringent regulations in the world.

Their purity is protected by delivery in sealed packages.

" Certified " supplies of many are available for food processors exporting to the United States.

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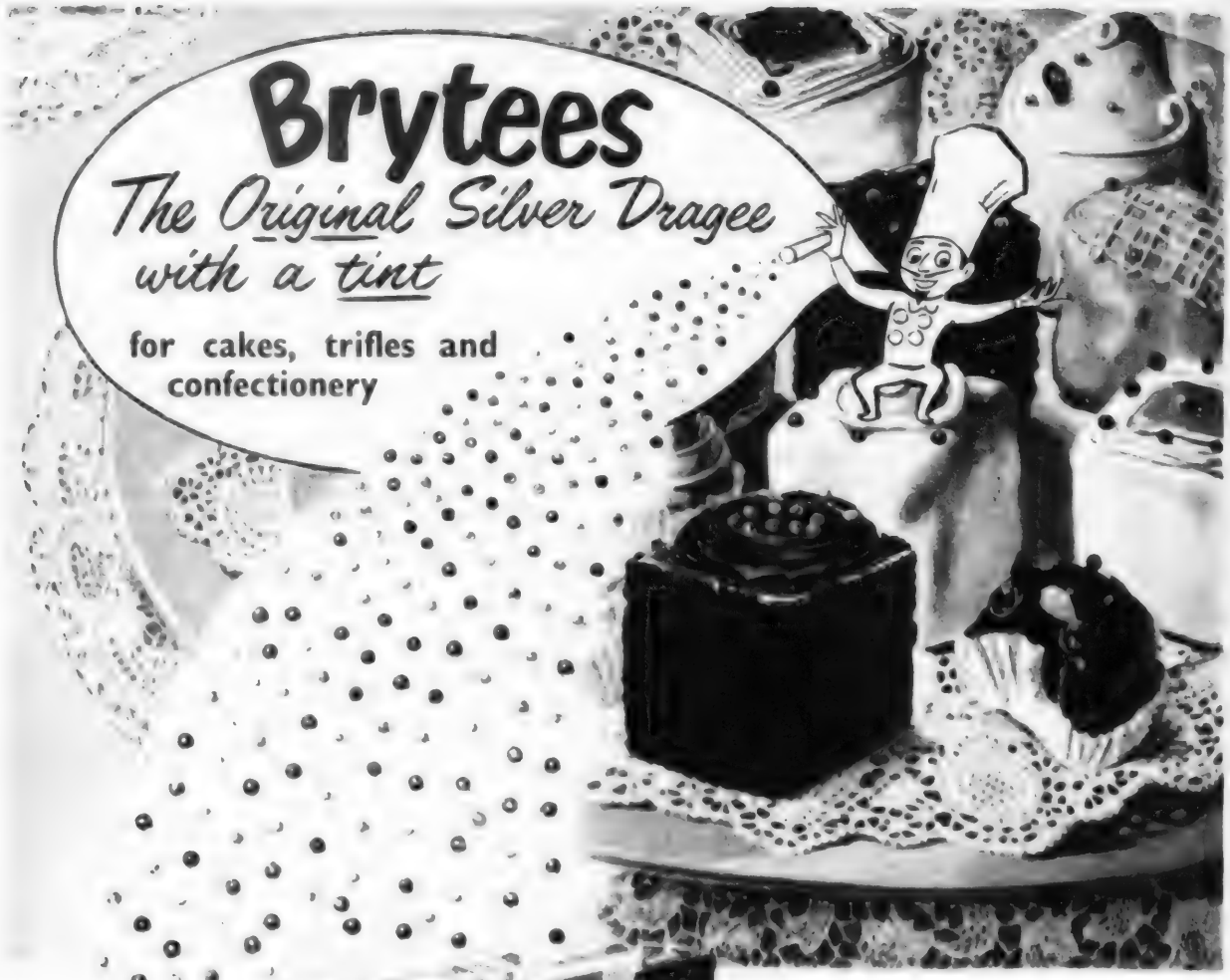
IMPERIAL CHEMICAL INDUSTRIES LTD LONDON SW1

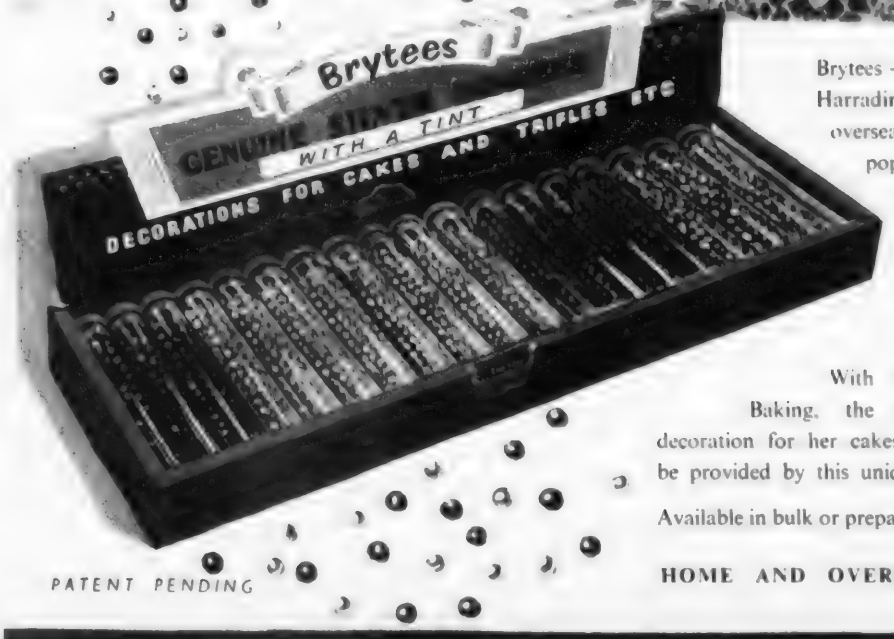
D.525

Brytees

The Original Silver Dragee with a tint

for cakes, trifles and confectionery





PATENT PENDING

Brytees — so successfully introduced by Harradine's—are today being sold in 16 overseas markets where their established popularity demands frequent shipments.

These brilliant Silver Dragees in many different transluscent colours are fast becoming as famous as their counterpart the traditional St. James Silver Dragees.

With the rapid swing-back to Home Baking, the housewife seeks perfection in decoration for her cakes and party-table which can only be provided by this unique product.

Available in bulk or prepacked in this attractive display carton

HOME AND OVERSEAS ENQUIRIES INVITED

J. HARRADINE & SONS LTD

Britain's leading manufacturers of Silver Dragees

ST. JAMES ROAD, [illegible]

Cartons and Composites

The fine quality of workmanship which characterises The Metal Box Company's metal containers is equally evident in the products of its Paper group. Cartons, composite containers, labels, bags and display material are all part of The Metal Box Company's complete packaging service—a service which includes the work of creative studios, the provision of closing machinery, technical advice, research facilities and world-wide marketing intelligence.

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Metal Containers · Paper Products · Flexible Packages · Plastic Films & Laminates

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Metal Box
'know-how'
does count!

P&S FLAVOURS

-The irresistible attraction!

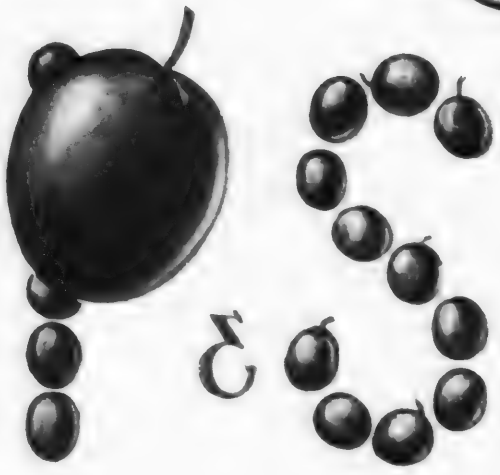
GREENGAGE E.M.

22/6 PER LB.

***Dosage:* 2 ozs per cwt.**

HIGH BOILINGS

This full natural fruity flavour is also perfectly suitable for jelly and gum work.



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put your products in the picture

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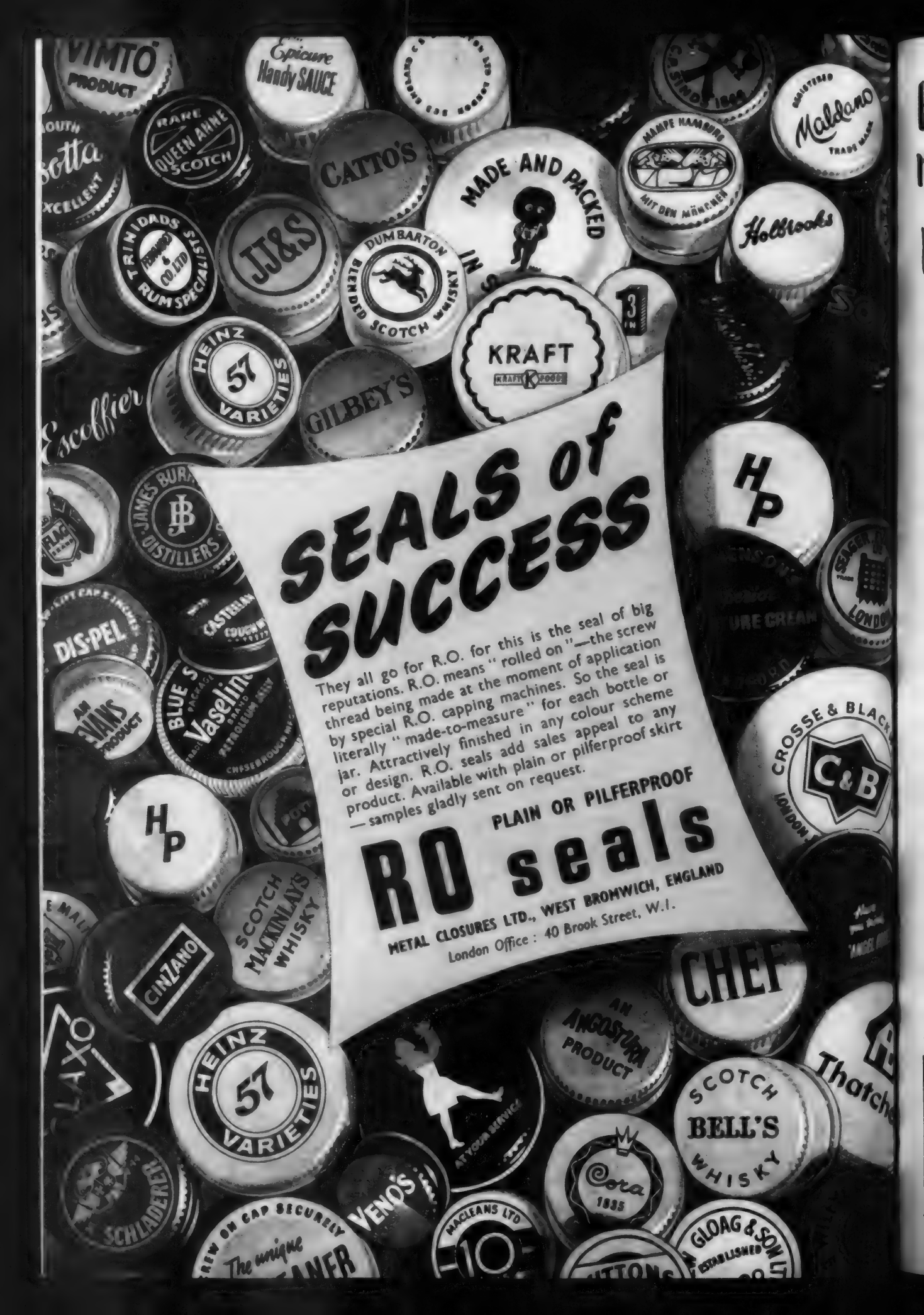
SEALS of SUCCESS
They all go for R.O. for this is the seal of big reputations. R.O. means "rolled on"—the screw thread being made at the moment of application by special R.O. capping machines. So the seal is literally "made-to-measure" for each bottle or jar. Attractively finished in any colour scheme or design. R.O. seals add sales appeal to any product. Available with plain or pilferproof skirt —samples gladly sent on request.
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Manufacturers of Gelatine for over a Century

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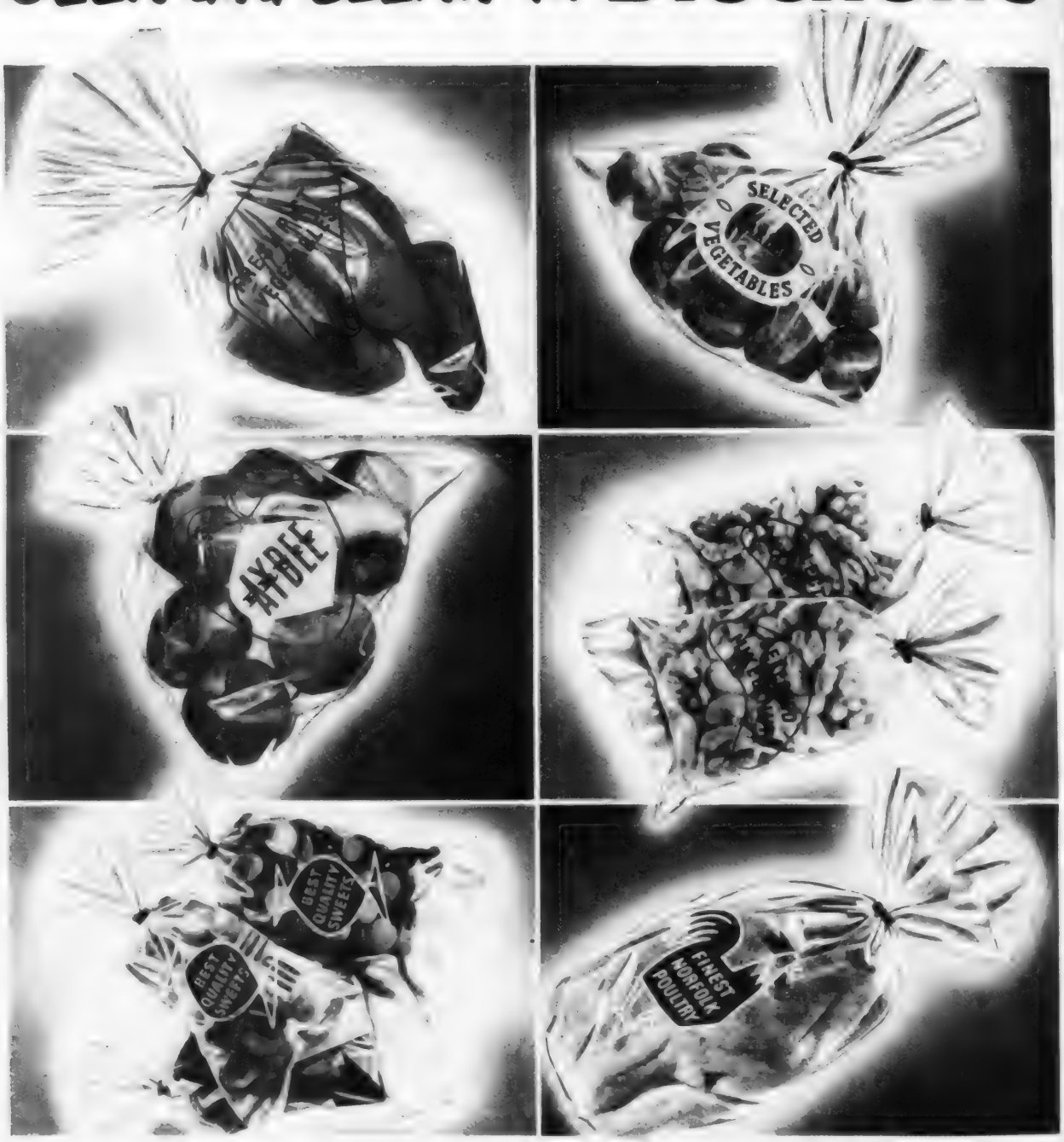
SEEN and CLEAN in Diothene



Diothene is a new flexible film for packaging. It is transparent for sales appeal, tough for protection and perfectly hygienic. Diothene has no odour, is non-toxic and cannot taint any food product. Diothene cannot cause corrosion in contact with metals. Heat sealing forms a strong durable weld, giving it excellent handling properties.

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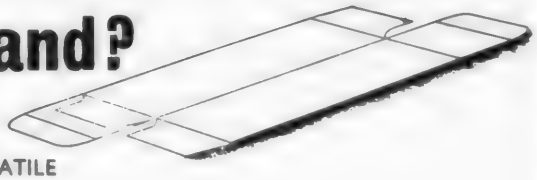
The tough transparent film that *ADDS SALES APPEAL!*

THE METAL BOX COMPANY LTD · *Flexible Packaging Division* · **THE LANGHAM · PORTLAND PLACE · LONDON W.1**

Are YOU wasting time and money doing this by hand?



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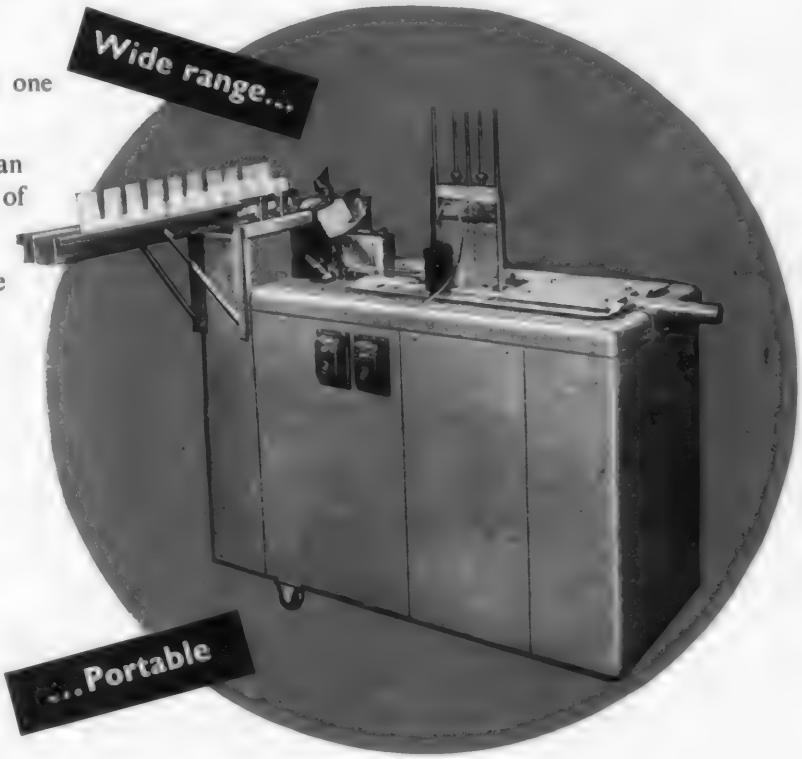
TUCK-O-MAT & CONVEY-O-MAT

AUTOMATIC MACHINES FOR ERECTING REVERSE-TUCK CARTONS

- Needs only the part time of one operator.
- Remarkable versatility. You can set up any size or shape of tuck-end carton.
- Changeover to different size takes only 10/20 minutes. Change parts inexpensive.
- Mounted on rubber wheels—one person can move it.
- Simplicity in design and construction reduces maintenance costs to a minimum.
- Saving in wages alone soon repays outlay.



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LIDDING · LABELLING · UNSCRAMBLING
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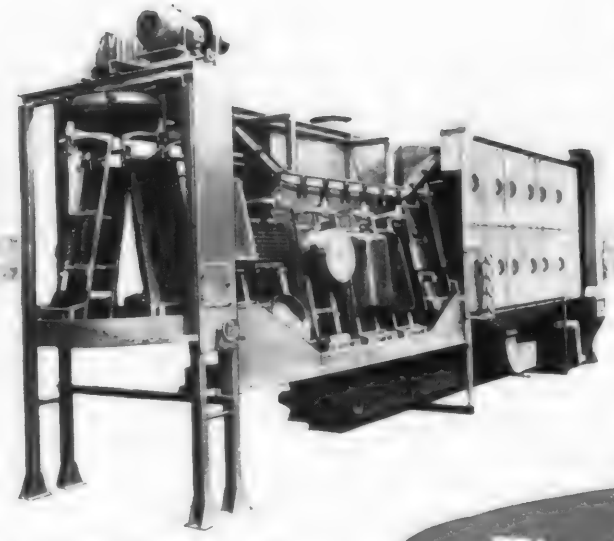
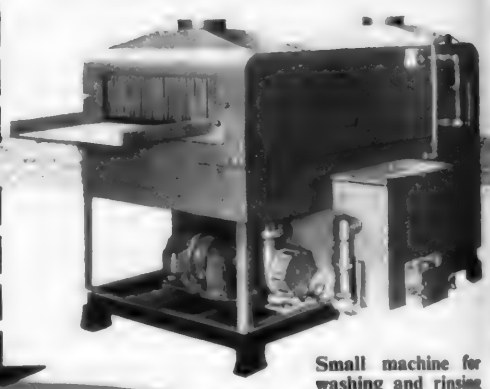


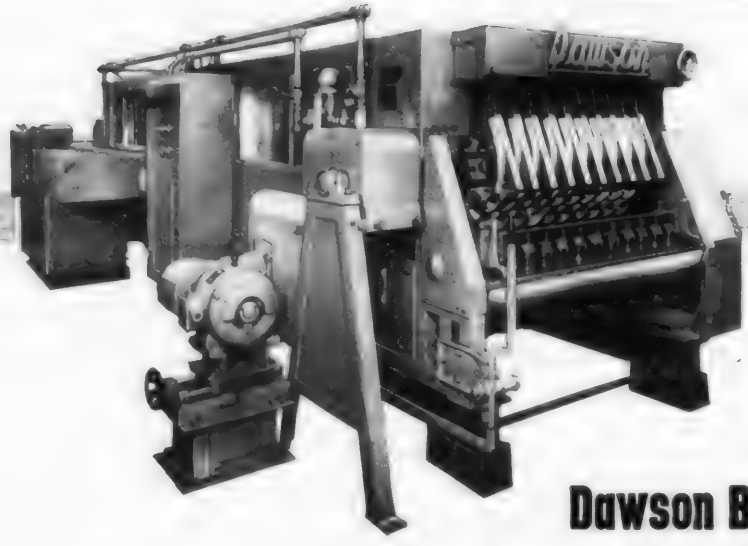
A monorail machine for washing, rinsing and drying varied Food Utensils.



Small machine for washing and rinsing Bakers' Trays.

ESTABLISHED 1864

The Quick, Economical
Dawson
Hygienic way

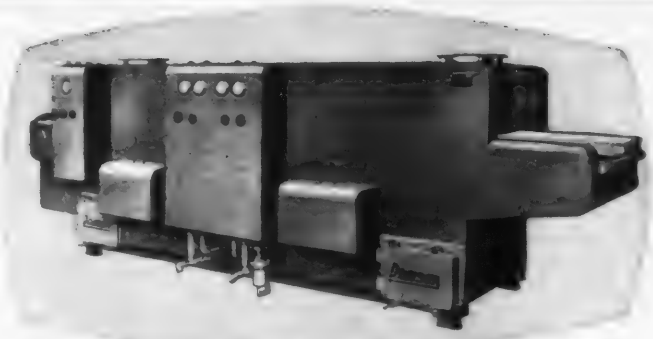


A Bottle and Jam Jar washing, de-labelling, rinsing and sterilising machine.

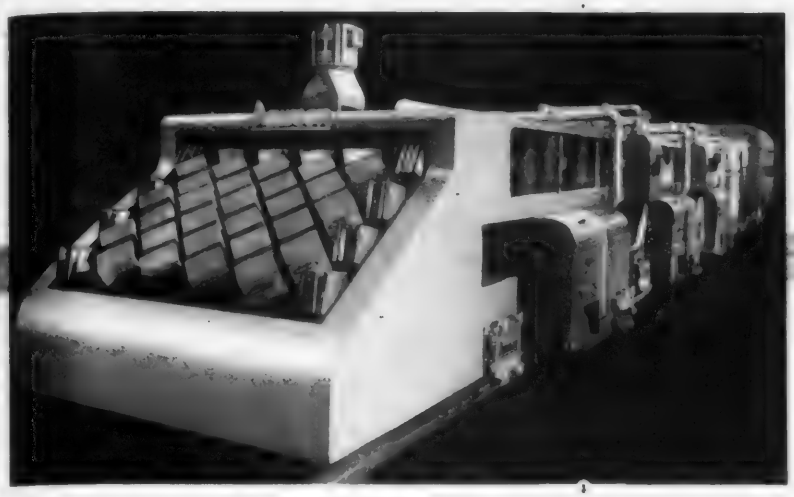
Tel.: Cleckheaton 1080 (5 lines)

Dawson Bros. Ltd., Gomersal, Nr. LEEDS

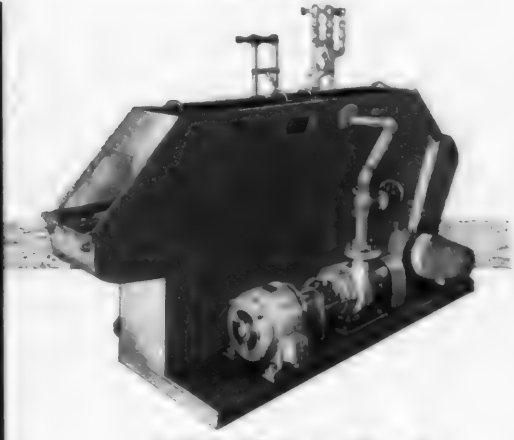
CLEAN



Washes, rinses and sterilises 200—300 trays per hour.



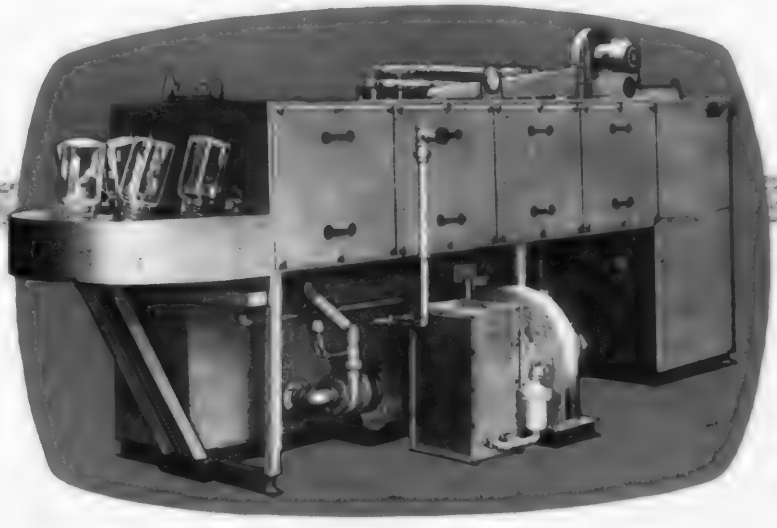
For washing and de-labelling and drying biscuit tins and lids. Capacity 2,000 per hour.



Small Can Washer and Rinser for 30—60 cans per minute.

Make sure that every type of container and utensil used in the manufacture of Food Products is clean, sterile and satisfies Health Regulations.

Dawson washing plant is used extensively today by manufacturers of all types of Food products. Whatever the size or shape of tin, can, tray, jar, bottle, container, mould or food utensil Dawson machines will wash and dry these articles in the minimum time for the lowest cost. Let us know what you have to clean and we shall be pleased to advise you.



A Rotary Jar and Tin washing and drying machine. Capacity 150 per hour.

London Office:
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Tel.: Wanstead 7777 (4 lines)

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for the
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Industry

The remarkable covering power of **PATTINSON'S LIGHT MAGNESIUM CARBONATE** *(one gramme having a surface area of 35 square metres)* has resulted in its increasing use in the salt industry, to promote free running by the dual action of separating adjacent salt crystals and by absorbing filamentary water.

Our Sales Technical Department would be very pleased to advise on the uses of this chemical in any powdered product where free running qualities are desirable.

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- *Each fitting is the result of the closest collaboration between expert designers and lighting engineers.*
- *Each fitting is made to rigid factory standards for long arduous service.*
- *Operating efficiency is guaranteed because the control gear and tubes are made within the G.E.C. organisation.*
- *Consult your contractor for the most suitable G.E.C. fittings . . . with OSRAM tubes of course.*

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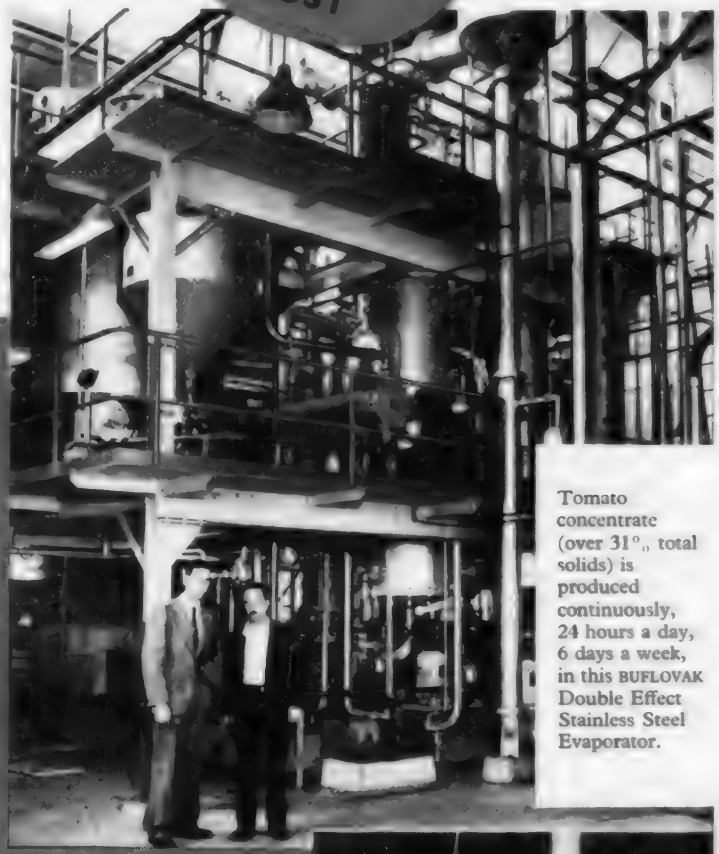
the 'fruits' of **BUFLOVAK** high grade concentration

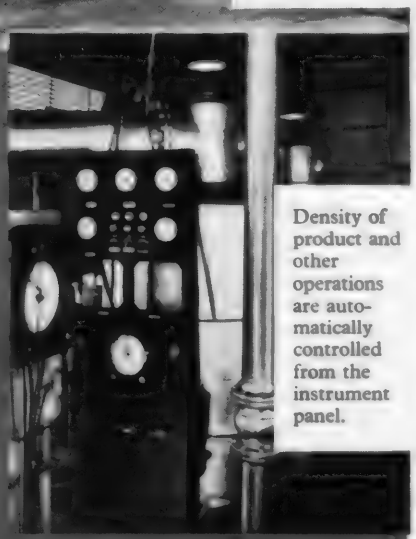
Is YOUR business with the concentration of tomato pulp, or, for that matter, any other fruit or vegetable. Do you need a smoother, more uniform concentrate retaining all the natural flavour—at lower cost? If so, these and other problems of concentration can be settled successfully with Blaw Knox BUFLOVAK Evaporators, the most up-to-date range of processing equipment of this type. Orange pulp, for instance, can be processed to keep not only the true flavour but the vital vitamin content. There are types and capacities to suit most food processing requirements, all of which are easy—and economical—to operate. Ask us to discuss the details with you!



Tomato concentrate (over 31% total solids) is produced continuously, 24 hours a day, 6 days a week, in this BUFLOVAK Double Effect Stainless Steel Evaporator.

LET'S TALK IT OVER...

Why not telephone Blaw Knox? They will advise on all evaporation problems and on the most modern processing equipment for foods, chemicals and the plastics industry, including Flakers, Dryers (atmospheric and vacuum), Kettles, Autoclaves, Condensers, etc. —without obligation on your part!



Density of product and other operations are automatically controlled from the instrument panel.

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including LONG TUBE VERTICAL RAPID CONCENTRATION FORCED CIRCULATION · LOW TEMPERATURE DOWN FLOW & THERMO RECOMPRESSION types

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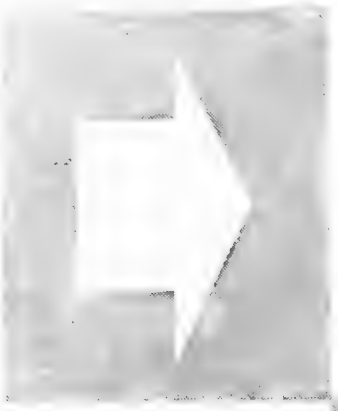
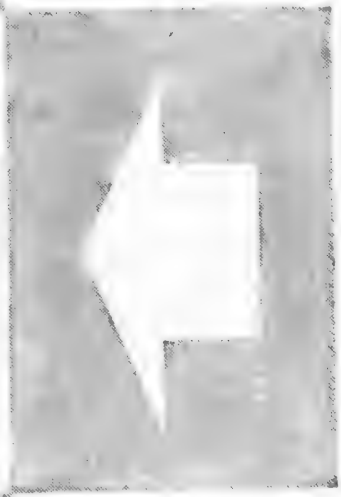
I.C.I. DENDRITIC SALT

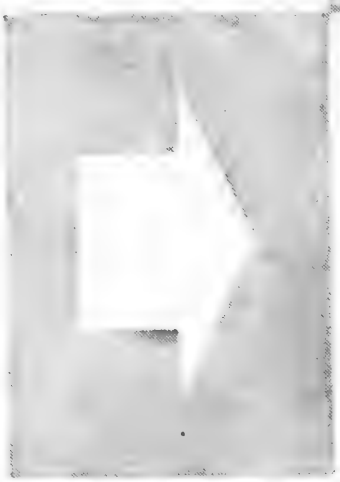
–a NEW fine grade for foodstuffs



I.C.I. Dendritic Salt is a fine vacuum salt with a new crystal shape. It is soft and floury, with the following distinctive qualities—which are of special advantage in many applications in the food and dairy industries :



- Outstanding non-caking properties
- High purity—99.6% sodium chloride
- Blends well with other finely-divided materials
- Low bulk density—ensuring good covering power
- Rapidly soluble in water



I.C.I. Dendritic Salt is of particular interest to users of Dairy or fine Crystal salt, since it not only offers technical advantages but is also cheaper.
Imperial Chemical Industries Ltd. are the sole manufacturers of Dendritic Salt, which is protected by patents in Great Britain and other countries throughout the world.

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The Brown Differential Converter, a mercuryless type of manometer, responds accurately and immediately to rapid changes in flow. Designed for universal flow measurement, this rugged instrument is simple to install, easy to maintain and gives a negligible displacement of fluid in the meter body.

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- The TABLES are supplied with special Noral Aluminium Sheeting which will not discolour the paste under any circumstances.

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XL GRADE

For specialised products such as Jelly marmalade. In colour and clarity, "X.L.Grade" replaces powdered pectins at less than half the cost.

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LIQUID SLOW-SET PECTIN

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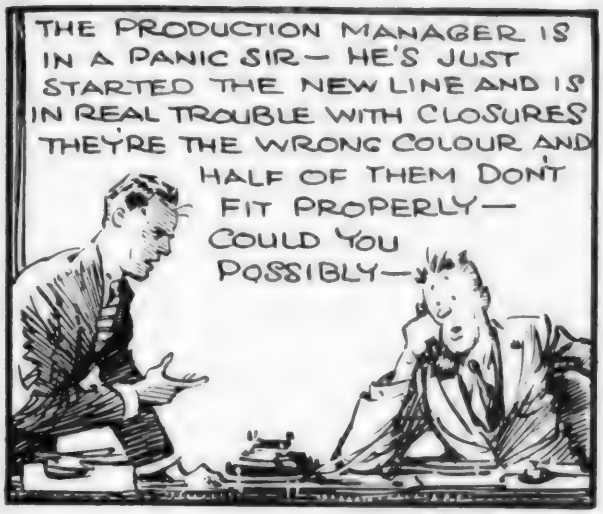
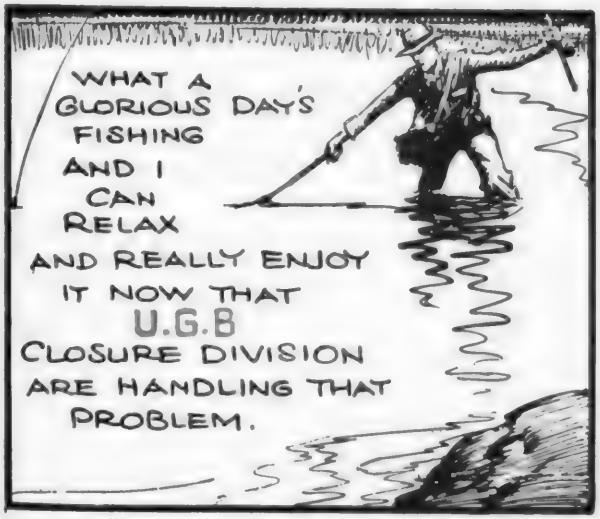
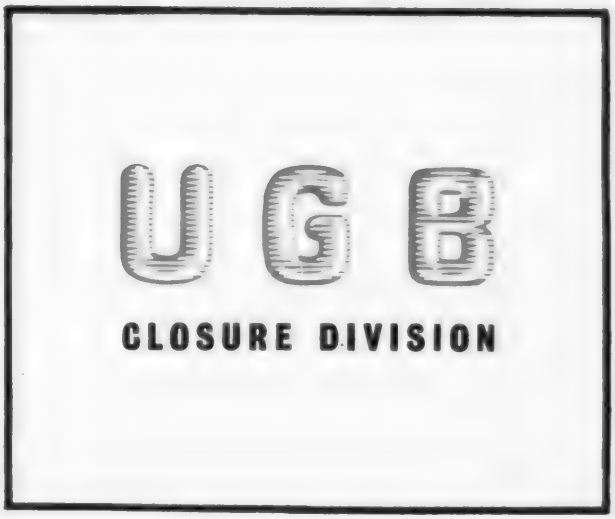

THE PRODUCTION MANAGER IS IN A PANIC SIR — HE'S JUST STARTED THE NEW LINE AND IS IN REAL TROUBLE WITH CLOSURES THEY'RE THE WRONG COLOUR AND HALF OF THEM DON'T FIT PROPERLY — COULD YOU POSSIBLY —

NOW LOOK! EVERYONE KNEW I WANTED A FIRST CLASS PACK FOR THIS NEW LINE. TELL THEM TO STOP GUESSING ABOUT CLOSURES AND GET ON TO U.G.B CLOSURE DIVISION YOU CAN LEAVE THE DESIGN, COLOUR AND FIT TO THEM — THAT'S THEIR JOB!





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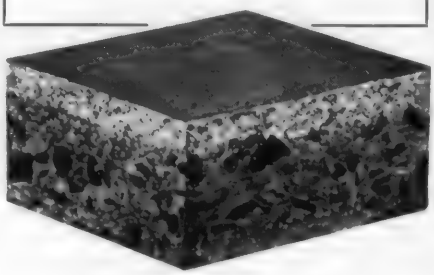

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in every industry—everywhere

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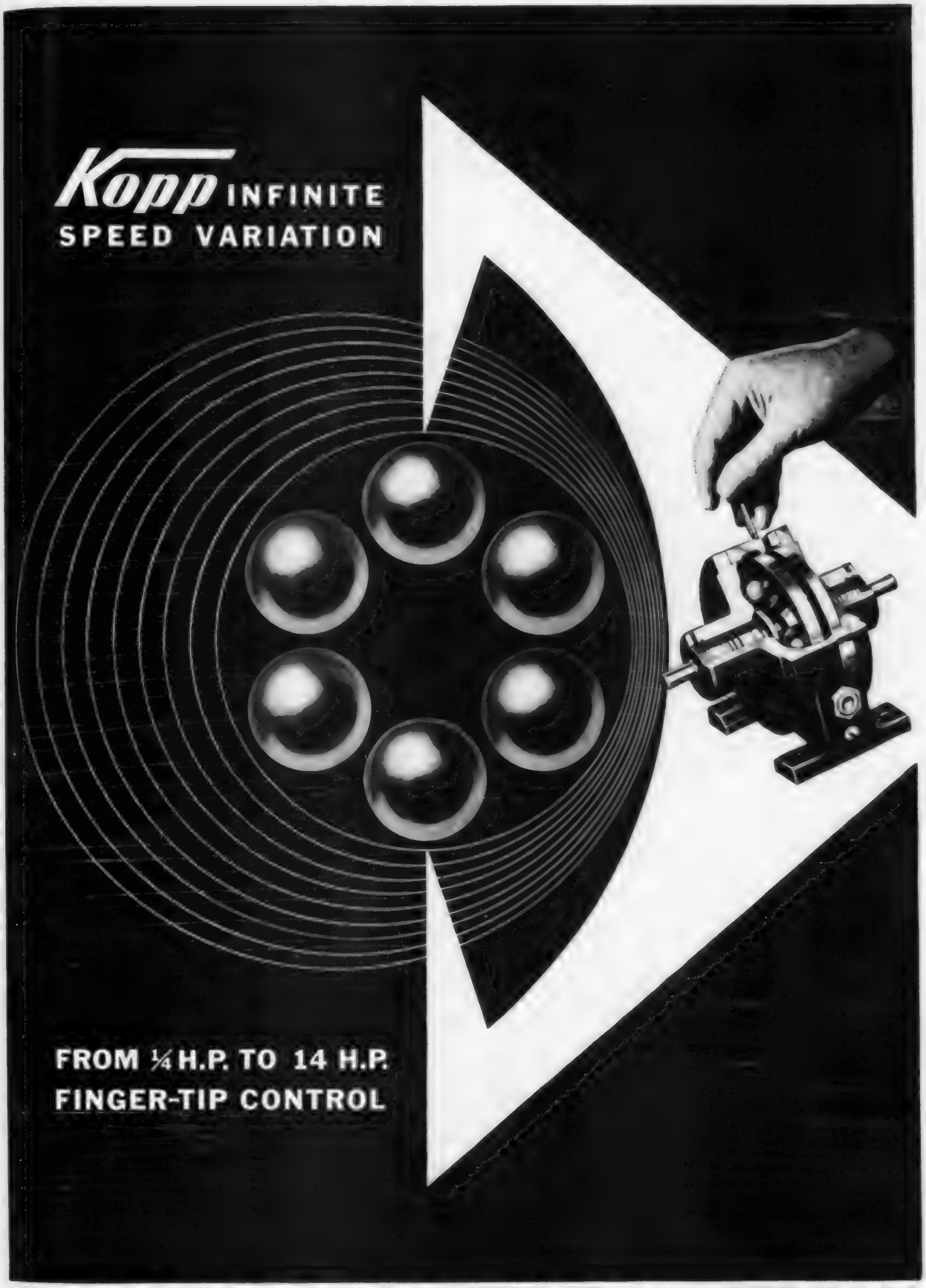

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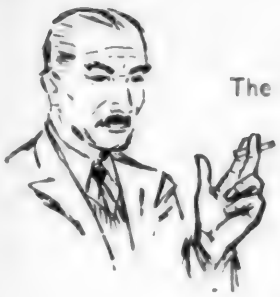

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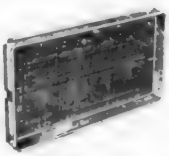

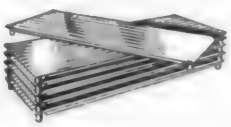

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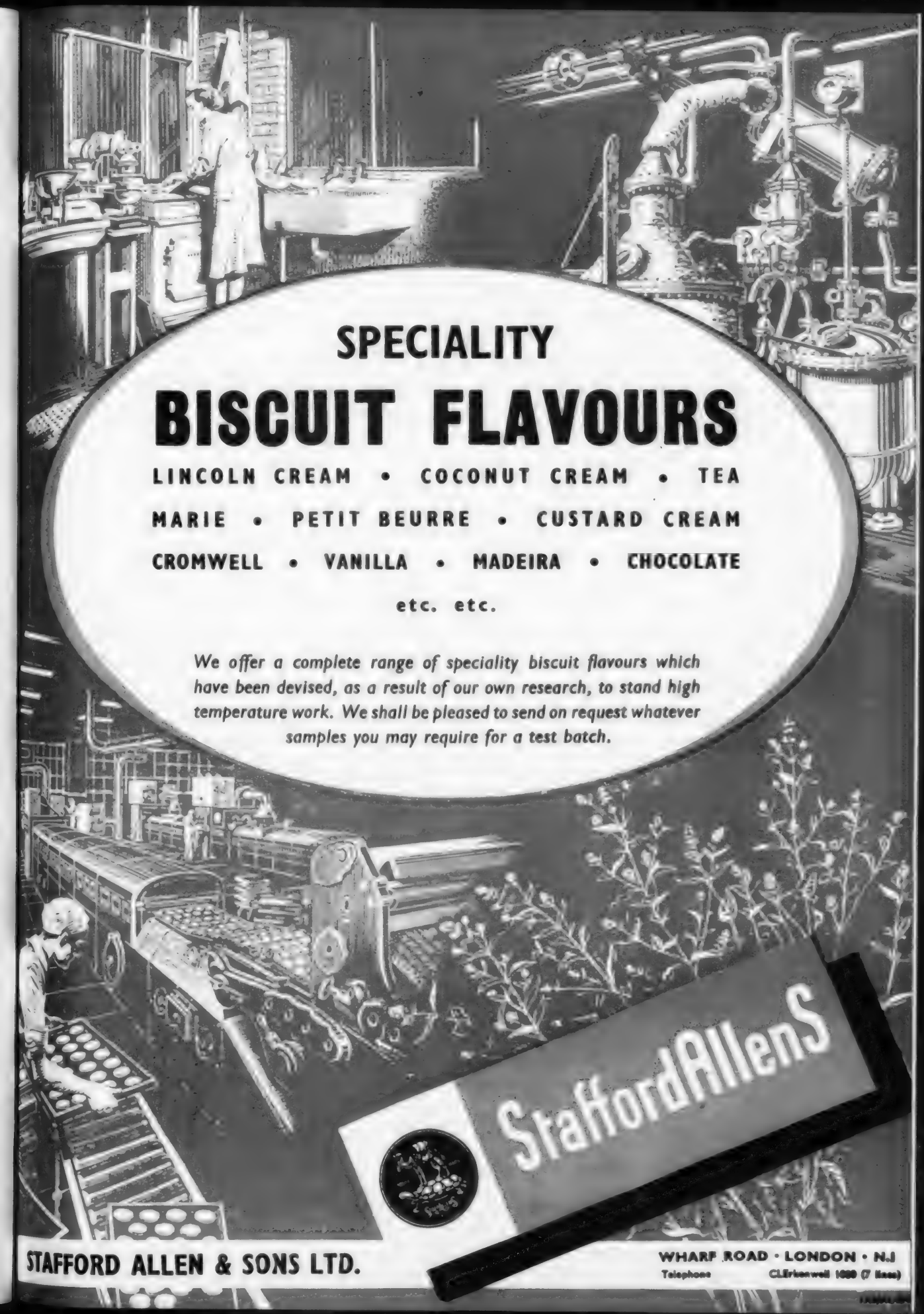
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We offer a complete range of speciality biscuit flavours which have been devised, as a result of our own research, to stand high temperature work. We shall be pleased to send on request whatever samples you may require for a test batch.
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C.P. are specialists in high standard finish Stainless Steel, continuous and batch processing patented equipment (controlled heating, cooling, mixing and aeration), for most kinds of food products.

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CAPACITIES H.T.S.T. Pasteurising 100-2,500 IMPERIAL G.P.H. and corresponding increases for heating and cooling duties.

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A first-class filter with outputs from 2,000-20,000 lbs. per hour depending on product range and application.

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Capacities of these universally used 1½ in. bore pumps are up to 2,400 Imperial G.P.H. at 24 ft. head. The perfect pump at the right price.

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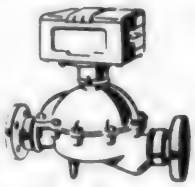

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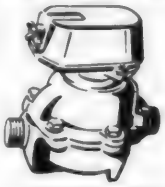
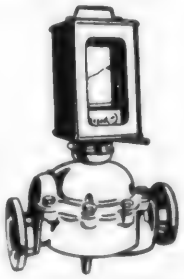
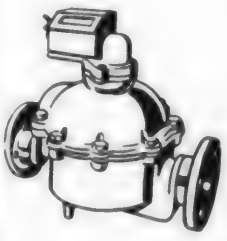
Can also be used to pre-set a determined quantity, with electric trip to operate solenoids, pumps, warnings, etc.



ZEROSET INDEX
Simple turning motion re-sets indicator to zero.



MECHANICAL RECORDER
Gives a graphic record on 5" x 12" chart; suitable for 4 hour, 8 hour, 1 day, 7 day periods



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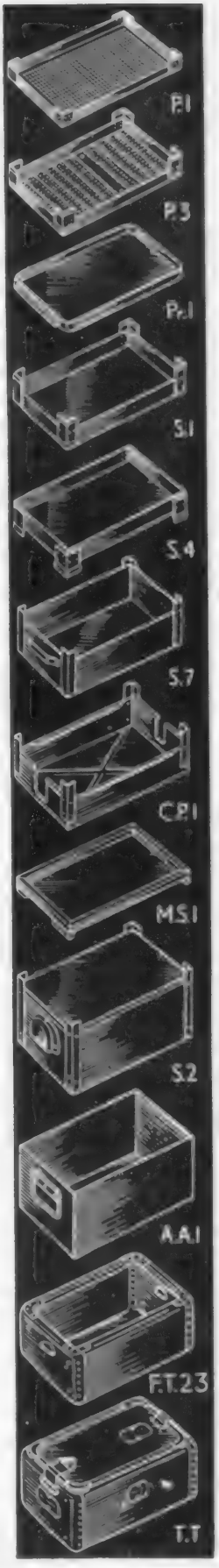

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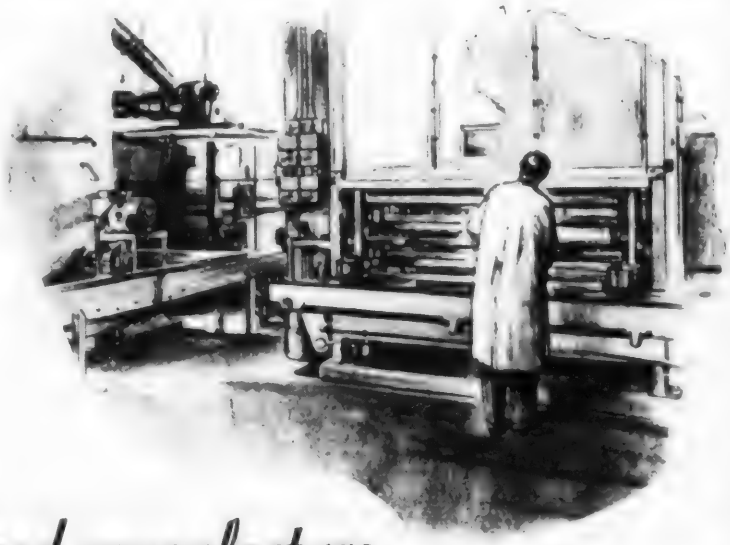

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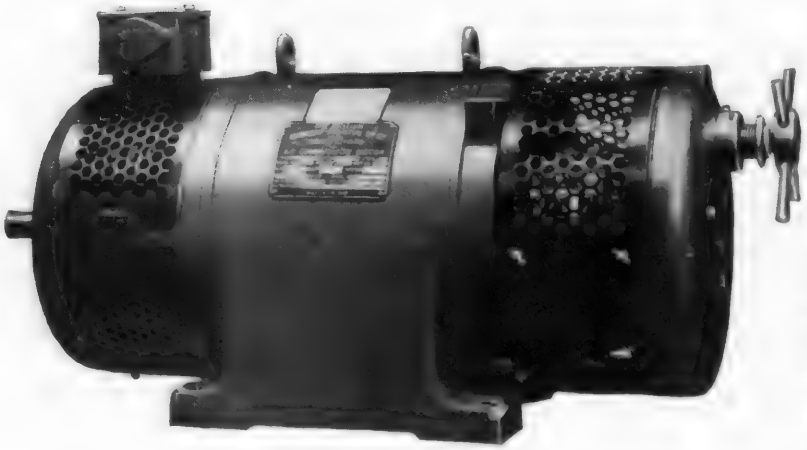

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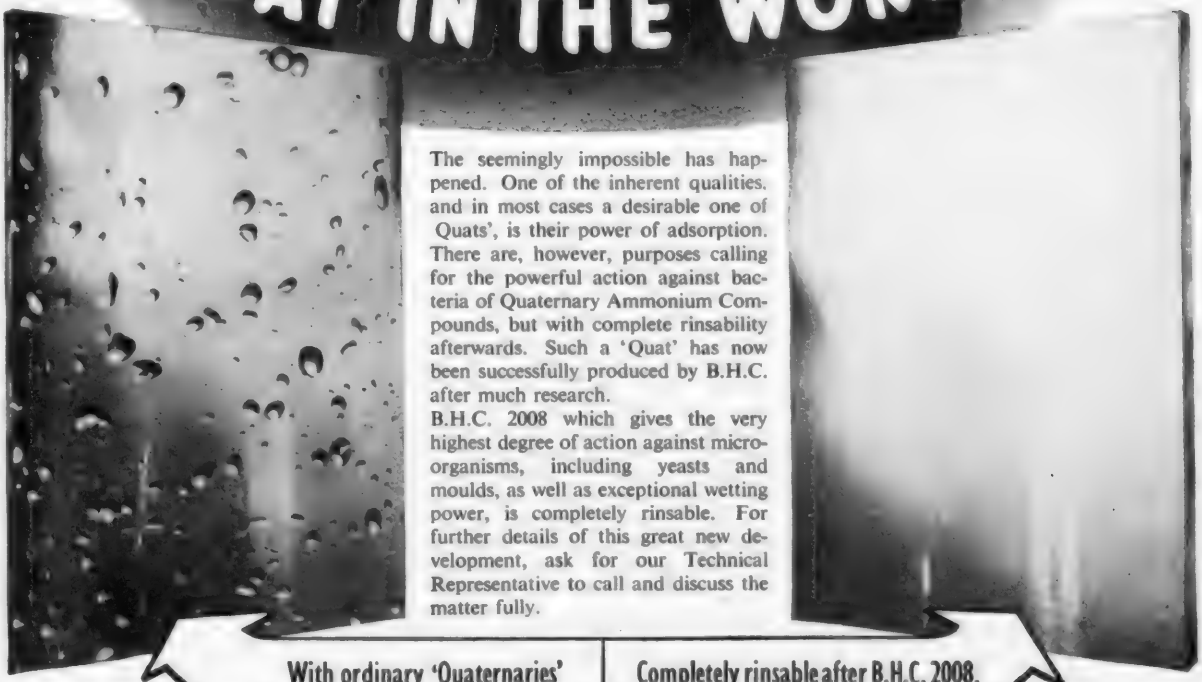

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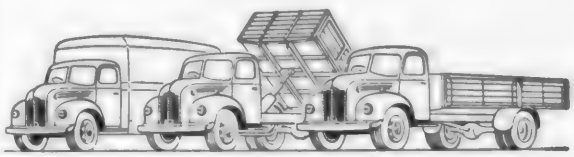

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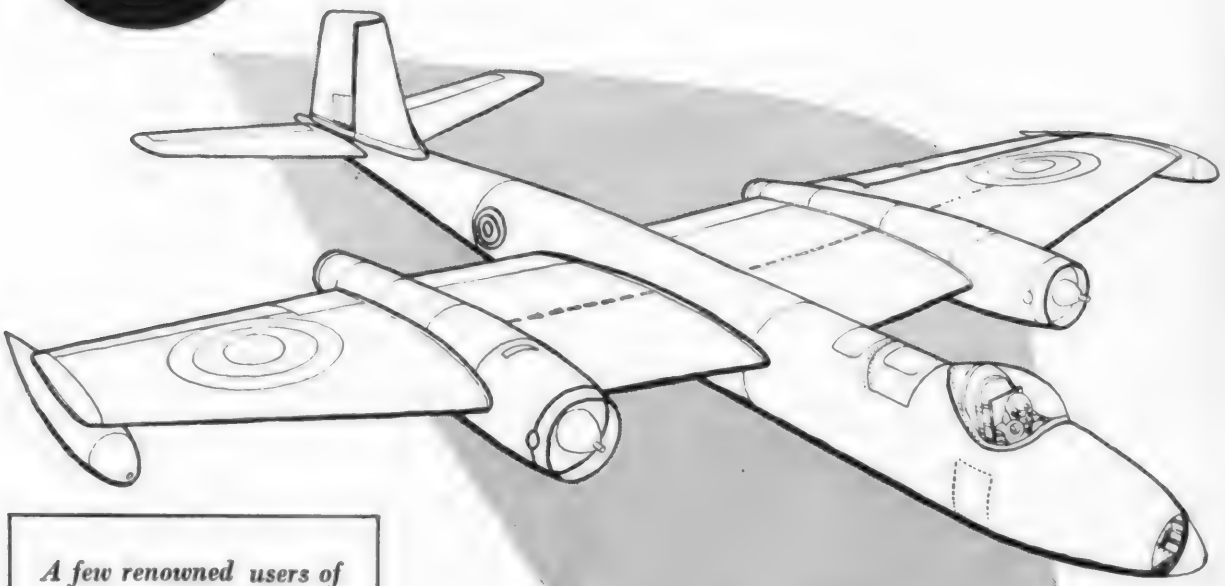

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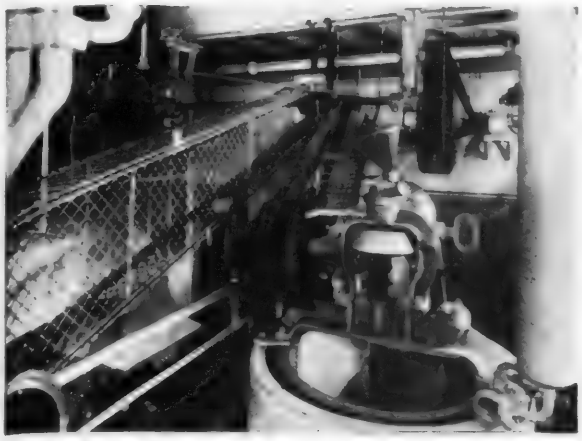
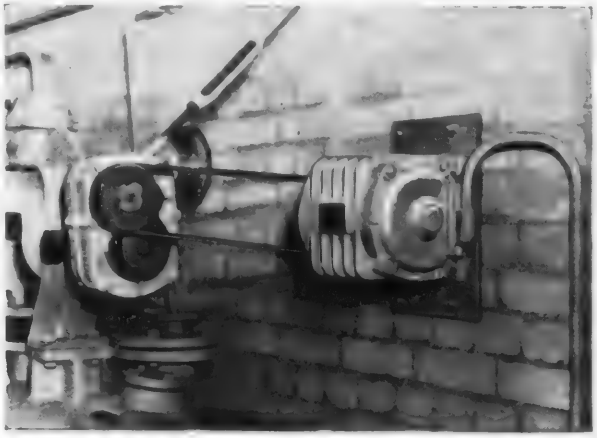


THE OLD METHOD.

A nationally famous firm of manufacturing chemists had the problem of driving chemical mixers at 60 r.p.m. A base mounted gear box was impractical and a cumbersome and expensive double reduction overhead drive had to be used.



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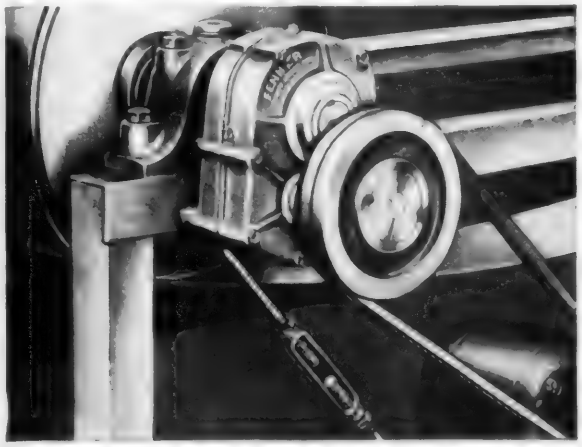
A Torque-Arm shaft mounted speed reducer was installed on top of the mixer driven through a Taper-Lock V-Drive by a wall mounted motor. Advantages: clean safer drive, economy in space, simplified maintenance, more useful power transmitted.



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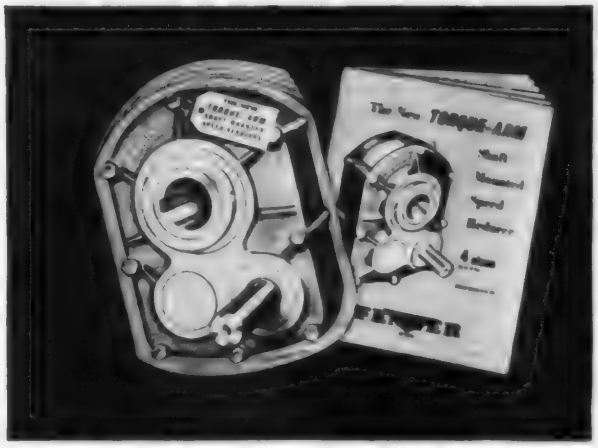

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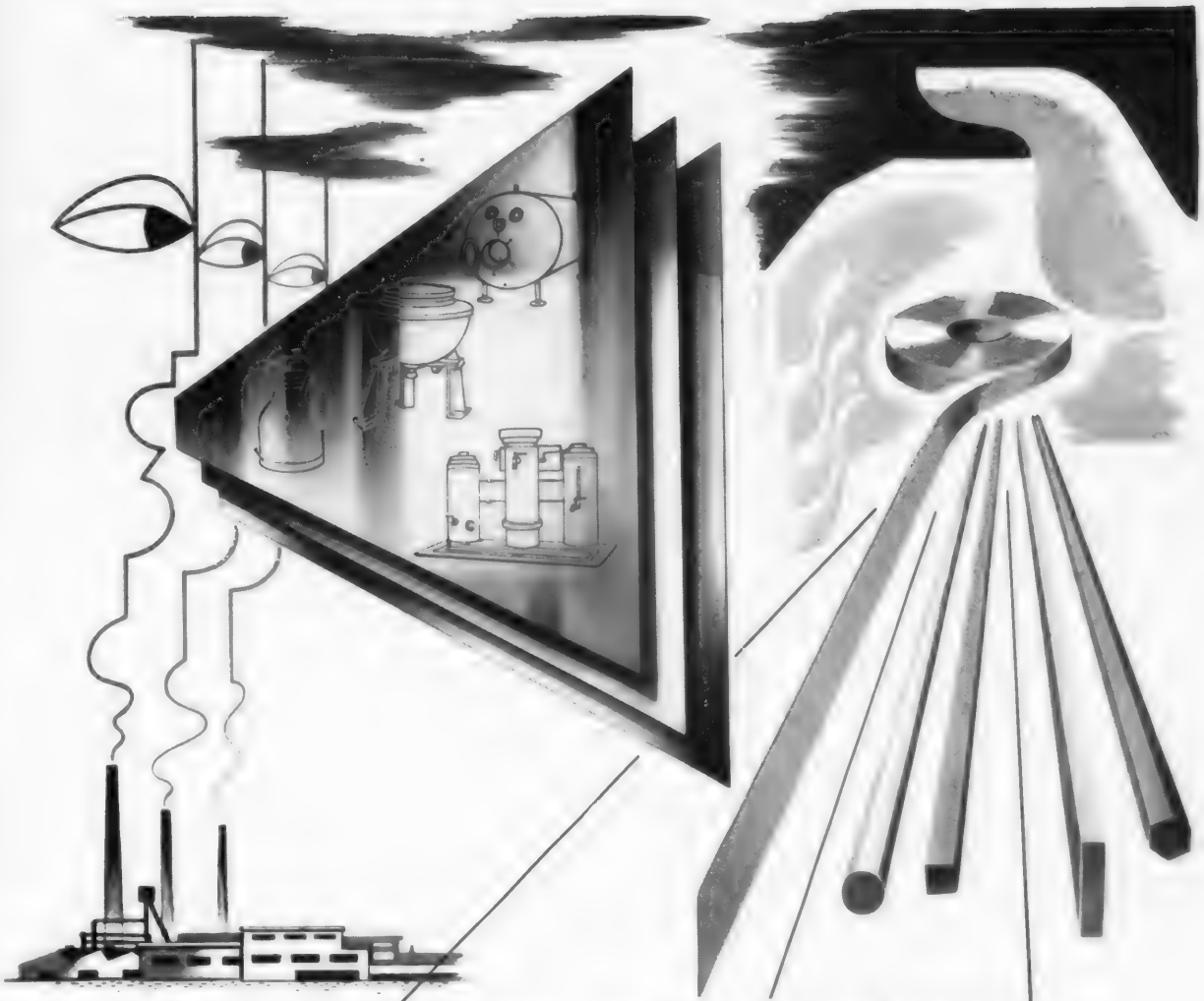

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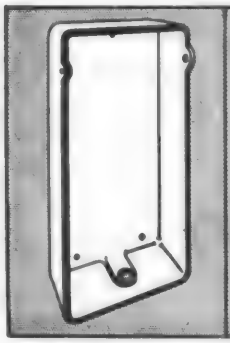	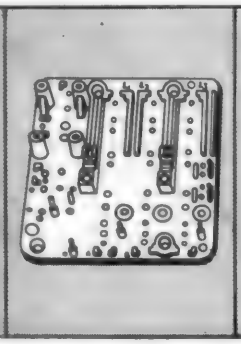	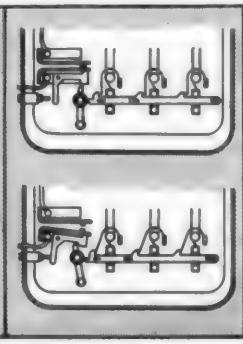	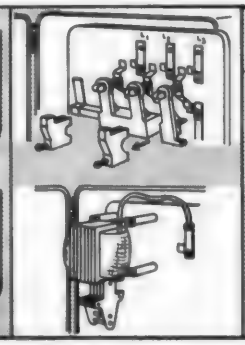	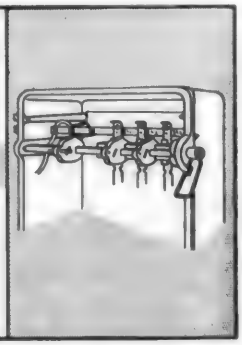
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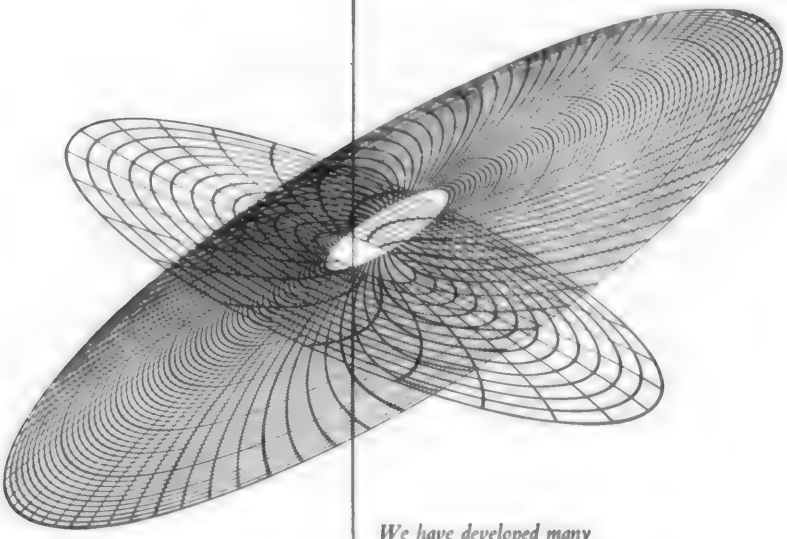

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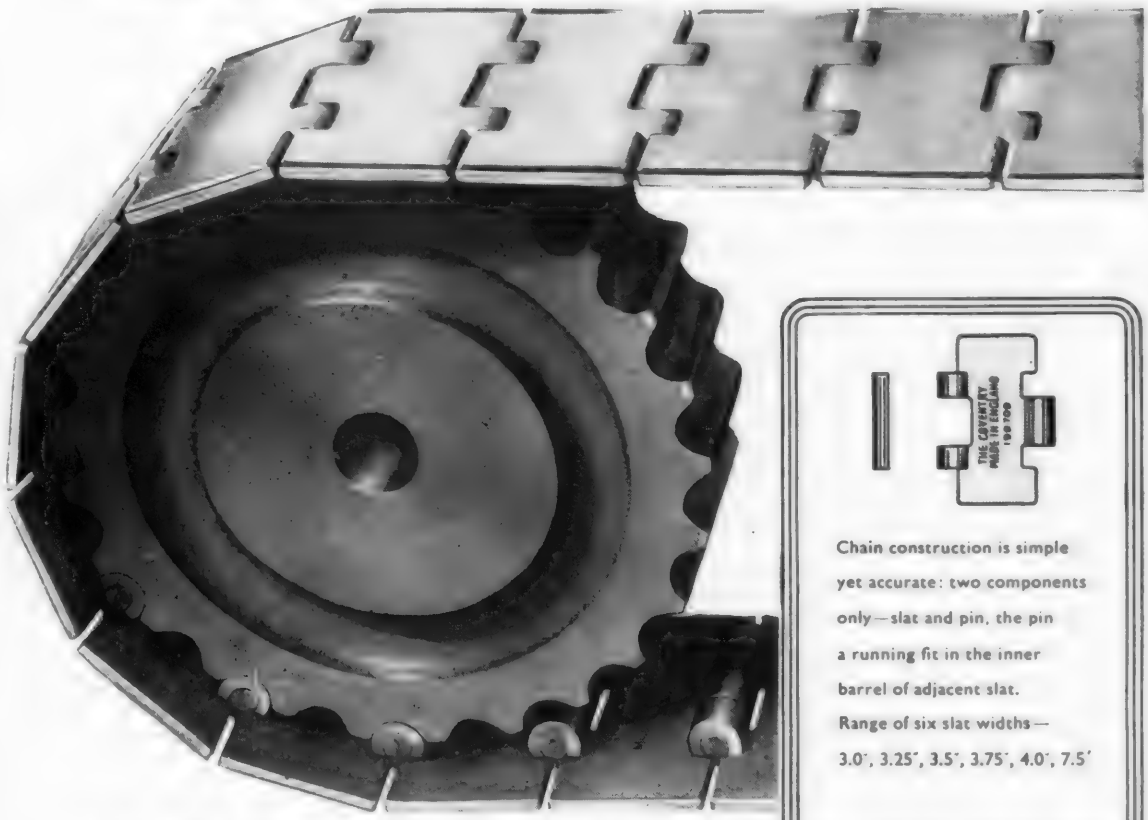

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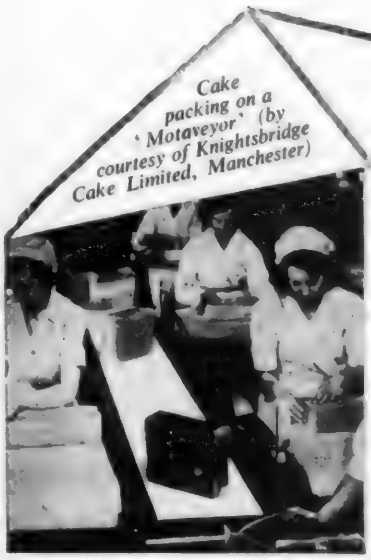
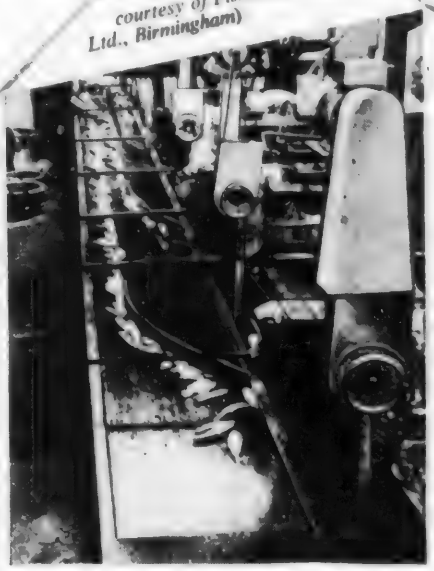


Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

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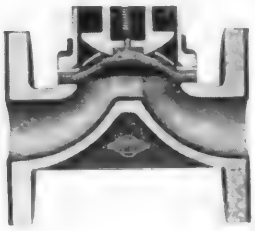

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FOOD MANUFACTURE

Vol. XXX. No. 11 · Published Monthly · November 1, 1955

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3. *Odour—Sorbitol has no odour.*
4. *Volatility—Sorbitol is non-volatile; solutions gain or lose water according to the conditions.*
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6. *Viscosity of aqueous solutions of Sorbitol, glycerol and corn syrup at 25°C. (Fig. 3). The viscosity at 70% is suitable for the usual mixing operations.*
7. *At certain concentrations it has similar preservative action to sugars but is less affected by biochemical contamination.*
8. *Sorbitol is an affective humectant, water being retained over a wide range of humidity and temperature.*

FIG. 1

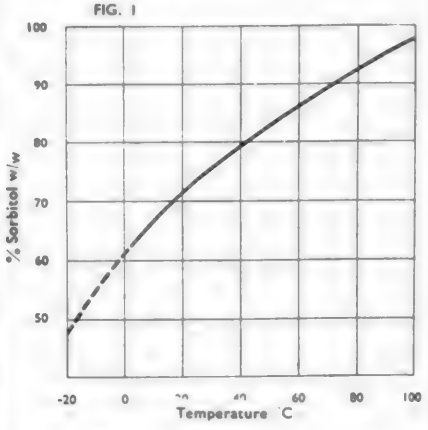


FIG. 2

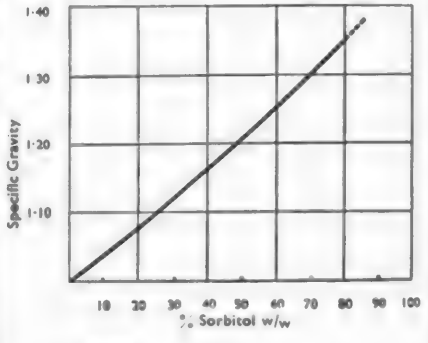
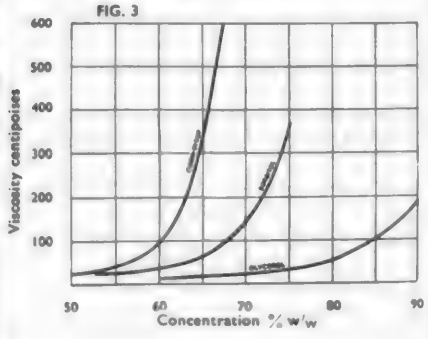


FIG. 3



FOOD MANUFACTURE

Vol. XXX, No. 11 November 1, 1955

How much coal in a barrel of beer?

A BARREL of beer can mean many things to many men. To the vanman it is a challenge to his dexterity and strength, to the publican it is a quantity of liquid waiting to be converted into £. s. d., to the chemist it is a delicate product of fermenting micro-organisms, to the fuel technologist it is . . . 60 lb. of coal!

Unfortunately for our national fuel efficiency, and for the brewers' profits, this figure is by no means standard. There is, in fact, a variation over the whole brewing industry of between 30 to 150 lb. of coal used per barrel of beer brewed. This extraordinary variation worried the Brewers' Society so in collaboration with the British Coal Utilisation Research Association they instituted a survey of heat utilisation in some 20 breweries. S. R. Broadbent and M. V. Murray, the technologists of the B.C.U.R.A. who did the survey have now reported their findings in the *Journal* of the Institute of Fuel.

They found that about half of the variation was justified by the fact that a brewery might or might not carry out such additional processes as bottling, pasteurising or grain-drying, but that an equal variation was due to differences in the efficiency of heat utilisation. Avoidable wastage occurred chiefly in steam generation in the boiler house and steam utilisation in the brewery, some breweries wasting as much as three times more fuel as was reasonably required.

The remedies are first to improve the efficiency of boiler operation, principally by using mechanical firing equipment suited to the present fuel supply, together with automatic control and technically qualified supervision of the boiler plant, and secondly by changing the procedure in the brewhouse to take full use of all opportunities for effecting heat economies.

Back-pressure power generation could be carried out economically by many breweries. Simple improvements could save the industry about 200,000 tons of coal a year, a reduction in fuel costs which varies from 1d. to 2s. 3d. per barrel.

Fish fried and frozen

QUICK frozen fish sticks may dramatically arrest the declining consumption of fish in this country, a serious trend in view of the fact that fish is one of the few staple foods in which Britain can be self-supporting. Their success in the U.S. has been called a "revitaliser of the commercial fishing industry."

America produced 50·1 million lb. in 1954, compared with 7·5 million lb. in 1953. In the first quarter of the current year, 18 million lb. were produced compared with 10 million lb. for the corresponding period last year.

Surveys have shown that while about 30% of consumers eat fish sticks as a substitute for other fish, a substantial majority eat them in addition to their usual consumption of fish and shell fish.

Speaking of his company's plans to sell "fish fingers" in Britain, Mr. J. R. Parratt, marketing director of Birds Eye Food Ltd., agreed that success in America does not necessarily mean success in this country. However, test sales in South Wales and Hampshire had very favourable results; Mr. Parratt says "we were staggered by the immediate demand."

Fish fingers are fillets with every bone removed, moulded into compact blocks. They are cut into small uniform portions, battered, crumbed, fried, cartoned and then quick frozen. In the home they need only heating to be ready for almost any meal.

In this country the popularity of quick-frozen fish in ready-to-use cartons has been growing steadily. In 1954 nearly 55,000 tons of white fish were quick-frozen, representing almost 7% of the total landings and over double the amount quick-frozen in 1953.

The new product logically extends this development. If people dislike fish it is usually because of the large amount of bone, because it can be messy and smelly in inexperienced hands and because of its variable freshness.

Quick freezing solved some of these problems but the new fish fingers go even further in removing objections to fish.

Food on film

FOOD manufacturers are among the most important users of advertising films according to Mr. W. J. Collins, a director of Pearl and Dean Ltd. Although these films are a firmly established feature of any cinema programme today, some people still think of them as something new. In fact, one of the first advertising films was made for Bird's custard powder in 1902! Unfortunately no copies of this film have been preserved. The earliest advertising film still in existence was made in 1916. After the first world war the cinema began to be regularly used for advertising. In 1921, for instance, Hugon's produced "The Way to His Heart" to advertise Atora suet, while in 1923 came two films for Ovaltine and one for Cadburys.

Many of the early advertising films ran for 5 min. or more; today the maximum length is 2 min. The last 5 min. advertising film made in this country was shot in 1942 to commemorate the centenary of Brown and Polson's. It was a documentary, tracing the history of maize from its earliest use as the staple diet of Red Indians.

Cinemascope has already been used for five advertising films made in this country, including one for Pan Yan pickles and one for Ovaltine. It remains to be seen whether any of the many other "scopes," "visions" and similar novelties which have been coming from Hollywood will be used for film advertising.

Biscuits versus cakes

MORE biscuits are being eaten than ever before because of their relative cheapness, according to the British Productivity Council. Higher productivity in biscuit factories, say the Council, has enabled manufacturers to keep prices down in spite of heavy increases in costs. Their recent review of productivity in the cakes and biscuits industry (No. 22) states that biscuit output rose from 363,000 tons in 1950 to 465,000 tons in 1954. Present prices of leading brands are only 61% higher, on average, than in 1939, although the cost of flour has increased about fourfold, the price of sugar has nearly trebled and wages are at from two-and-a-half to three times the pre-war level.

Reasons given for this achievement include increased mechanisation of production processes, more efficient handling of materials and a reduction in the number of types of biscuits made by individual manufacturers. The increase in sales of packaged biscuits, as compared with those sold loose, has also aided efficiency, since it enables machines to replace hand labour in packing.

The technological conferences now held annually by cake and biscuit manufacturers have also proved effective. Started as a result of a recommendation made by the Productivity Team from the industry which visited the United States in 1951, they have given manufacturers the opportunity to hear experts on a wide range of subjects of importance to them as a body as well as the chance to discuss their own special problems.

Despite the prosperity of the industry generally, many smaller biscuit making firms are at present facing stiff competition. Cake manufacturers also have suffered a 10% drop in sales since sugar was de-rationed, mainly because housewives have preferred to bake cakes themselves now that all ingredients are available. Since cake production is not concentrated in large factories and cake baking cannot be so easily mechanised as biscuit manufacture, it has not been possible to avoid passing increases in costs on to consumers.

Work study is recommended as a possible solution of some of the problems of small biscuit manufacturers and cake firms. Examples are given of how method study, in particular, has enabled economies to be made with little or no capital expenditure. At one factory for example, a revision, based on method study of the system of loading lorries cut labour requirements by 65%, enabling nine men from an original team of fourteen to be transferred to other work.

Future advances in the industry will come as much from the scientist as the engineer, it is concluded. Much research remains to be done on flour, fats and baking processes to prevent spoilage during production or while materials are held in store.

Milk powder in perspective

THE advantages and disadvantages of milk powder which is often distributed in sub-tropical and tropical countries to combat malnutrition, are discussed by Dr. D. B. Jelliffe, consultant to the World Health Organisation, in a recently published monograph "Infant Nutrition in the Sub-Tropics and Tropics."

More proteins and vitamins than are contained in the mother's milk are needed for the proper development of the child, and it is essential to ensure that the expectant mother, as well as the nursing mother herself, has a diet sufficient in vitamins and proteins. While recognising the value of milk powder as an immediately available source of protein of good biological value, Dr. Jelliffe warns that it is sometimes entirely foreign to the food habits of the country in which it is distributed.

Again, while the distribution of milk powder stimulates interest among parents, paediatricians and government officials in the value and use of milk in infant feeding, it may divert mothers from the im-

portance of breast feeding, and there is a danger that the supply may fail since free distribution of milk is not always regular. Breast feeding, according to Dr. Jelliffe, should ideally continue up to the age of about two, supplemented by foods containing vitamins and proteins, such as milk products, gruels made from rice or other cereals, ripe bananas, fruit and eggs.

In short, Dr. Jelliffe recommends that milk powder should be distributed "selectively," *i.e.* in countries where the need is great, where the habit of using milk is already well established and where a dairy industry can be readily developed. In sub-tropical and tropical regions, nature usually provides foods which, if properly utilised and prepared, would make it possible to avoid nutritional diseases. Among these are milk (including sheep or camel's milk), vegetables, fruit, eggs, fish and shellfish. The control of nutritional diseases is largely a question of education, which must take into account local customs and resources.

A taste for foreign food

THE United States is usually regarded as a major food exporter so it comes as a surprise to learn that today one-third of all American imports are foods grown or processed in other countries. In particular there is a boom in specialities, probably a consequence of the increasing interest in foreign dishes shown by Americans who have sampled them while on holiday abroad.

In the first quarter of 1955 over 43½ million lb. of tea, more than 67,000 tons of cocoa, and 4½ million bags of coffee were imported. More foreign cheeses are being bought. Italy sells most, with some 17 million lb. in 1954. Swiss, Danish, French, and Dutch cheeses are also imported in substantial quantities. A trade organisation, the Cheese Importers' Association of America, has over 110 member-companies. Another rising food import is processed meat; Denmark and Holland are the largest suppliers. Canned Argentine beef and Canadian hams and bacon have also become big import items.

America's annual consumption of spices now amounts to 150 million lb. Grocers who before the war stocked 20 or fewer varieties now may stock as many as 50. The major spice imports are black and white pepper (37 million lb.), mustard (22 million), cinnamon (11 million), paprika (8 million), poppy seed, caraway seed, and nutmeg. Other important classes of food imports in America are bananas, olive oil, sugar, fish, dates, and garlic. Altogether, U.S. food purchases from other countries comprise at least 40 different and substantial "trade items," each of which either supplements home production or appears on the market as a "speciality."

Whisky galore

THE annual report of Sir Henry Ross, chairman of the Distillers Co. Ltd. which we summarised last month (p. 428) throws light on the somewhat curious situation of Scotch whisky today. Sir Henry reported a very satisfactory year for the group's gin companies at the expense of their Scotch whisky blending companies and the trend seems to have firmly set. The public turned to other spirits during the shortage of Scotch and now gin has been selling slightly more than whisky for the past seven years. Before the war nearly four times as much whisky was sold as gin. Whisky is more readily available now and advertising has increased consumption, but it is still a long way from the pre-war level of almost 7 million gal. On the other hand the demand for Scotch—particularly for the half-dozen better-known brands—continues to exceed supply in spite of the duty which has helped to raise the retail price by about 180% on the pre-war cost.

The duty is being continually fought by the distillers, one argument being that it encourages other governments to follow the same example. As Sir Henry Ross pointed out, import restrictions in Argentina and Brazil have practically closed these markets to British whisky exporters. At the moment the demand for Scotch is so great that supplies can be switched to other markets, but post-war stocks of whisky are now maturing and the time will soon come when sufficient whisky will be released to saturate the present overseas markets. Figures issued by the Scotch Whisky Association show that at least 23 million gal. of the whisky laid down in 1949—the first post-war year in which production reached its pre-war level—will be maturing every year from 1956 onwards. The present consumption level, on the other hand, is only between 18 and 19 million gal. per year.

Meat processing : an American study

SMALL meat processors, particularly those dealing chiefly with pork and pork products, are given an opportunity of comparing their operations with those of a similar concern in America by means of a new report (No. 89) of the U.S. Foreign Operations Administration. Entitled "Plant Operation Report for Meat Processing," the publication is distributed in this country by the British Institute of Management, 8, Hill Street, London, W.1, at 5s. It is one of a series of reports compiled by the Bureau of Labor Statistics in Washington. These reports are not intended to give novel technical information but are designed to provide businessmen with yardsticks for comparing the efficiency of their own plants.

The plant described is a small, independent concern engaged chiefly in the slaughtering of pigs and

the processing of fresh pork and pork products. It also slaughters other livestock but on a much smaller scale. Twenty-six people are employed.

Four major aspects of the plant's operations are discussed in detail, namely: production, staffing, working conditions and marketing and costing. The sections dealing with production give a description of manufacturing techniques, plant layout, products made, machinery and equipment used and the functions of management in co-ordinating the entire production.

Although the man-hours worked by each employee are given, these are general figures and unit-man-hours for separate departments and specific operations are not shown. The size of the plant does not warrant such records and, in any event, the workers' operations are too flexible to make them practicable.

The staffing pattern is listed, operation by operation, together with a resumé of the job duties and skills required, and a description of the recruitment and training of new workers. After information on the plant's labour force and working conditions, marketing and cost aspects are examined. Percentage ratios are given in order to show the relations between material, labour and other manufacturing costs. The channels through which the plant sells its products, its purchasing and sales methods and the relationship of marketing costs to total operating costs are also noted.

While the report is no substitute for the advice of on-the-spot engineers and technologists, it is a valuable guide for the smaller meat processor.

In praise of Camembert

FRANCE'S reputation for fine foods was upheld at the recently staged annual butter and milk congress in Paris. Special attention was paid to cheese. There are at least 400 different kinds of cheese in France ranging from those which improve with age to others whose fleeting flavour can only be properly enjoyed if they are eaten within a few hours on the spot where they are made.

However, in spite of the ready fervour with which Frenchmen confer distinction upon their country's more delectable products, nobody so far as we know has paid any higher honour to cheese than an American gentleman. A true gourmet, he declared that his life had been saved by Camembert cheese (the circumstances have been glossed over but we do not think he meant it quite literally) and insisted on erecting a statue of its inventor, Madame Hurel. His first offer, made some years before the war, was treated as a hoax, but when he duly arrived he was able to persuade his French friends that he was in earnest. Thus the New World honoured one of the small glories of the Old.

Oysters again

Reports of a promising Cornish oyster industry come to mind now that oysters are again in season with an "R" in the months to come. It is to be hoped that the British version of *Ostrea edulis* will revive to meet any competition from imported oysters of France and Holland, particularly since the oyster has had a British habitat and made history here throughout the centuries.

Whitstable was famous in Agrippa's time, while the Romans at Richborough in Kent literally "knew their oysters" when re-stocking their Rutupian beds. The poor uncivilised Briton, wrote Roman historians, may be pardoned his ignorance since he produces such delectable oysters. Then the limelight switches to France. Professor Costé of the Collège de France pioneered the study of an oyster's life cycle, and the mason Michelet of Arcachon discovered the perfect tile to which young oysters would attach themselves, and Arcachon went ahead with 500 million oysters a year. A British chapter to the story is then provided by our Ministry of Agriculture and Fisheries who carried out invaluable work in the oyster tanks of Conway and Lympstone.

The "R in the month" stipulation for the oyster season is at least as old as 1599, when Sir William Butts in "Dyets Dry Dinner" wrote of "oyster unwholesome in all months that have no R in their name." To this John Wilson replied in his *Noctes Ambrosianae*: "A month without an R in it has nae richt being in the year!" Whether one is browsing in the works of Pepys, Smollett, Dickens, Lewis Carroll or many others, a reference to oysters is sure to crop up sooner or later. Sam Weller's well-known remark about oysters having a "wery good power o' suction" is not so original as his "wery remarkable circumstance that poverty and oysters always seem to go together"—together, that is, in times when the favourite of today's gourmet were but a few pence per dozen, enabling the poor man to "rush out of his lodgings and eat oysters in reg'lar desperation," as Sam put it. Early writers marvelled at the man who "first broke the oozy oyster's pearly coat and risked the living morsel down his throat." At that primitive period it had not been realised that swallowing an oyster was "swallowing a piece of machinery (and going machinery, too) greatly more complicated than a watch."

As far as we know the late George Bernard Shaw, whose revulsion at "burying dead bodies in one that was alive" is recorded in our Obiter Dicta column this month, made no comment on the practice of swallowing live oysters. Perhaps he saw no need to be fastidious and, like the rest of us, cheerfully gulped them down with brown bread and lemons.

Catalytic Removal of Oxygen from Food Containers

AND OTHER IMPROVEMENTS IN FOOD PRESERVATION

By J. King, O.B.E., F.R.I.C.

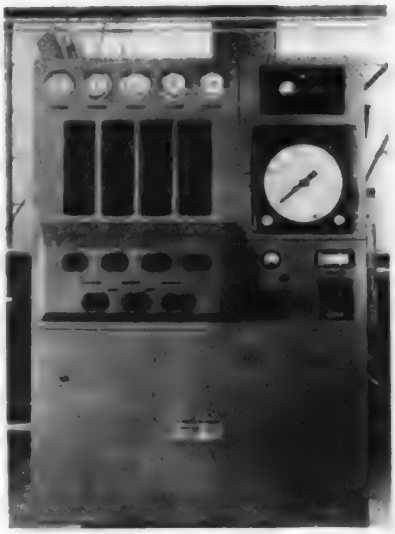
(*Department of the Government Chemist*)

The potentialities of the gas-packing method of preserving food in cans have been greatly widened by the invention of a catalytic method of removing residual traces of free oxygen within the sealed container. By this means the risk of oxidative deterioration is obviated. This outstanding development, which has been patented by the author and the Minister of Supply, is described in the following article. Mr. King also reviews other modern improvements in food preservation and considers the future of the can in relation to his invention.

OXYGEN, although essential for life in mammals and for many processes of metabolism, may bring about great difficulties in the storage of foodstuffs. A new patent, No. 734,197, issued to the Minister of Supply, describes an ingenious method of removing all traces of oxygen from the container in which the food is stored, thus preventing oxidative fat and other undesirable changes due to oxidation. To quote the claim made in the patent, it is a:

"Process for preserving substances such as foodstuffs or other substances in sealed containers which comprises removing substantially all the residual free oxygen from the sealed container, whether present in residual free air therein or arising subsequently from air initially occluded in the substance, by introducing hydrogen with the inert gas into the container in the presence of a catalyst arranged in the container before the container is sealed, the said catalyst being one capable of causing hydrogen and oxygen to form water, and thereby converting any residual oxygen into moisture."

Perhaps the most firmly established process for bringing about a reasonable reduction in oxygen is the "inert gas-packing" used in the milk powder industry with some success for many years. In this process the powder is packed into standard tinplate cans and sealed hermetically by spinning on the lid, using an efficient sealing compound between the body of the can and the lid. After piercing each lid to provide a small hole for removal of the internal air, a batch of the filled cans is transferred to a vacuum chamber where the air is pumped out and nitrogen fed in to atmosphere pressure. At this stage the holes are sealed with solder and the cans tested for leaks. Lea and White,[1] however, found that when spray dried milk powders were packed by this process, although the headspace of the cans contained only 0·1% of oxygen immediately after the nitrogen packing, this increased to about 1·6% during the course of 24-72 hr. due to desorption of oxygen by the particles of milk powder. In their experiments, pure nitrogen was used and the vacuumising and inert gassing repeated. In normal commercial practice with several types of dehydrated foods, analysis of the residual gas carried out in the Department of the Government Chemist over a period of years has shown that close attention to detail is necessary to achieve this figure, and 2-3% of oxygen is frequently present. Since air contains 21% by volume of oxygen, the process brings about an appreciable diminution, but experience shows that this is insufficient if foods are to be stored for any length of time, particularly in the tropics.



The "Nitroneal" generator.

For many years attempts have been made to reduce this residual oxygen to a negligible amount, and a major advance was the introduction of the "Deoxo" catalytic gas purification process by Baker Platinum Ltd. The small amount of oxygen—0·5 to 1%—normally present in commercial nitrogen is removed by mixing with it the requisite amount of hydrogen, and passing the mixture over a catalyst which consists of palladium suitably dispersed on ceramic granules. The oxygen is thus combined with hydrogen to produce moisture in oxygen-free nitrogen. The next advance was made by the *Nitroneal* generator introduced by the same company, which generates a mixture of nitrogen and hydrogen containing any predetermined amount of hydrogen

between 0·25 and 25%. By employing a suitably balanced mixture, it becomes possible to carry out a deoxidising process in the filled and sealed can, by placing a catalyst in the can at a suitable stage in the filling process. Any oxygen which is desorbed by the foodstuff or which gains access mechanically during the sealing of the can is thus converted into moisture which in small amounts is comparatively harmless compared with the effect of residual oxygen.

Preservation methods

The history of food preservation shows that very few major advances have been made since the time of Nicholas Appert (1810). They include the manufacture of really gas-tight tinplate cans by high speed mechanical means, followed by automatic testing for leaks, and inert gas-packing culminating in the present patent which enables the last trace of oxygen to be removed. The applications may be quite varied and entail a considerable amount of development. It is, of course, possible to store fats such as lard, containing small amounts of antioxidants, *e.g.* dodecyl gallate for long periods without having recourse to the expense of inert gas-packing. Many foods such as full cream milk powder, however, contain fat dispersed in such a way as to make the use of antioxidants impracticable. Commercially, the increased cost of employing the process must be justified by improvement in the flavour of the article after storage. For export to hot climates such a process would be a real advance, as reasonable shelf-life at temperatures approaching 90°F. has proved to be impossible with some foods. In the presence of even small quantities of oxygen some dehydrated foods such as dried carrots rapidly develop a most objectionable hay-like odour and flavour unless stored at very low temperatures. Some twenty years ago, the writer carried out a number of storage tests on foods such as biscuits, milk powder, dried vegetables, etc., using low, medium and high temperatures, with and without inert gas-packing. Unfortunately, many difficulties were encountered. Firstly, large tinplate containers of approximately 4-gal. capacity, although carefully hand-soldered, were not quite hermetically sealable—only about 1 in 6 was really satisfactory. Secondly, only commercial nitrogen containing an appreciable amount of oxygen was available. Thirdly, no practicable method could be devised for the removal of the residual oxygen in the container. Suggestions such as the use of pyrophoric iron or alkaline pyrogallol were ruled out as being suitable only for limited research purposes. It was, however, clear from the results of these early experiments that the lowest temperature tried, *viz.* 18°F., combined with inert gas-packing was very effective. Biscuits retained their original delicate flavour for several years. Dried carrots stored at 98°F. in normal air developed the typical hay-violet odour within a space of weeks, although at 18°F. the flavour was reasonable after several months. Cold storage is, however, extremely expensive, and is usually reserved for perishable foods such as meat, butter and eggs.

No attempt seems to have been made to apply the inert gas storage principle to foods in bulk. This necessitates the use of large vacuumising chambers such as are used in France for the fumigation of cereals, dried fruit, etc. These chambers are capable of withstanding a high vacuum, and have so far been used for foods in boxes, sacks, etc., and not for large metal containers capable of being hermetically sealed. The use of large metal drums with the aid of these chambers does, however, offer possibilities, since the chamber method enables gas-packing to be carried out without any gas pressure strain on the containers, the inert gas being brought to atmospheric pressure before sealing each drum or canister.

Antioxidants

Rancidity of fats due to the absorption of oxygen has been widely studied, and the first comprehensive review appears to have been made in 1938 by Lea[2] working at the Low Temperature Research Station at Cambridge. Since this date he and other workers have devoted much time to the subject, and have devised quantitative tests for rancidity. The rancidity which is generated in oil-containing nuts, cereals, etc., on storage is greatly accelerated by the presence of active enzymes. Although many seeds and grains when whole remain in good condition on storage for months or even years, the ground seeds may become rancid very quickly because the enzymes are liberated from the plant cells and rapidly attack the oil, producing free fatty acids and glycerol. The fatty acids as such may not be particularly objectionable, but they are frequently converted into malodorous and distasteful products by oxidation. It has been found possible with certain grains to remove or render inactive the greater portion of these enzymes.

Dr. T. Moran and his colleagues[3, 4, 5] at the Cereal Research Station have shown that by a suitable moisture treatment, followed by abrasion, practically all the lipase may be removed from oats, as the enzyme is located almost entirely in the outer pericarp. This treatment may greatly prolong the storage life of oatmeal and oat products. The generation of rancidity in fats may be slowed down considerably by the incorporation of antioxidants, and a study of the scientific and patent literature shows that in recent years a vast amount of research has been carried out on the chemistry and action of antioxidants. In some industries, such as the rubber industry, the toxicity of antioxidants may be of minor importance compared with efficiency. The food industry, however, requires that an antioxidant may be consumed for long periods, even by invalids, without harmful effects. The difficulty in devising adequate tests on animals closely related to man is almost insuperable. The usual L.D.50 test on rats for acute toxicity may be reasonably related to effects on

man, but really long-term effects may have no relationship to such a test. The difficulty in relating animal tests to man has been emphasised by the study of "agenised" flour on dogs compared with other animals. Whereas dogs appear to be readily susceptible to "running fits," many animals, and even possibly man, can tolerate flour treated by this process almost indefinitely. It is, however, difficult to rule out some remote effect on humans, particularly on those with defective organs. It is questionable whether any known antioxidant is desirable in the basic foods for infants or invalids, and this principle has been recognised by the legislature in the total prohibition of additives to milk or milk powder. It thus seems desirable to prevent deterioration of many foodstuffs not by addition of antioxidants and the like, but wherever possible by removing the source of the deterioration, or by lowering the temperature of storage. Deterioration due to the oxidation of non-fatty constituents of foodstuffs such as carotene seems to have attracted far less attention than fat oxidation. Although of less importance, it is very troublesome with certain dehydrated vegetables and merits further research.

"Browning" effect

The so-called "browning" effect of stored foods has, however, been the subject of considerable research for some years. This is now known to be due to the combination of carbohydrate and proteins or amino acids, and can be quite serious when certain milk products are stored at relatively high temperatures. During the late war, when it became necessary to develop assault packs capable of providing palatable meals with the minimum of preparation, a tea mixture was devised from which a palatable beverage could be obtained merely by the addition of boiling water. Deterioration due to the "browning" and other effects was severe at high storage temperatures with some mixtures, and in addition, the solubility rapidly decreased. Finally, a reasonably successful mixture was devised, consisting of sweetened milk powder, sugar, and finely divided tea. It is thought that antioxidants in the tea had a beneficial effect, and the sugar incorporated in the milk before spray drying assisted in delaying the onset of insolubility of the milk powder. There is little doubt that free oxygen in the can played a major part in deterioration, since the free gas in the can after long storage had a composition very different from that of air.

The future of the can

The modern tinplate container is the result of an immense amount of metallurgical and engineering research. The composition of the base steel plate is carefully controlled, it is cold-rolled to a very exact gauge, and finally annealed, tempered and surfaced by a most ingenious series of processes. Tinplating follows by a new electrolytic method which ensures an even coating with the minimum expenditure of tin, now one of the more expensive metals. The modern high speed body-forming machine is a triumph of engineering skill, fabricating upwards of 300 bodies per min., soldering the folded and hammered side seam to give a perfect joint with no excess of solder—also an expensive item. The hermetically sealed joints on the top and bottom of the so-called open-top can require careful gauging of the tinplate, accurate adjusting of the double seaming machine, and the use of a perfect sealing compound. The bodies are frequently decorated before forming, and the finished can provides a robust and elegant container for foodstuffs. This immense expenditure of skill can provide only limited protection, *e.g.* from light, insect and other contamination, and compression or deforming during transit. Deterioration due to oxidation is inevitable when oxygen is present; the speed at which this takes place increasing rapidly with increasing temperature. For a short shelf-life in temperate climates the modern packs made of attractively printed plastic is sufficient and much cheaper. Probably in the near future hermetically sealed tinplate containers will be used only for heat-processed foods such as meats, milk, fruits, etc., and those dry foods, the flavour of which deteriorates on storage. Having expended so much ingenuity on ordinary and inert gas-packing, the conclusion is that the further step of removing the last traces of oxygen is not only logical but essential if the tinplate container is to justify its cost.

The author desires to thank the Government Chemist for permission to publish this article.

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Note.—Since writing the article, the author's attention has been drawn to a similar claim for removing oxygen from food containers made in British Patent 632,182 granted to Baker and Co. Inc.

Stability of Ascorbic Acid in Citrus Concentrates

When stored at temperatures between 10°F. to 75°F. citrus concentrate products deteriorate physically and chemically very rapidly, but the loss of ascorbic acid is only about 4%. The rate of deterioration of citrus concentrate is a function of temperature and concentrates held at temperatures of 0°F. to −20°F. are very inactive chemically. The ascorbic acid loss at these temperatures is 2%.

Ascorbic acid is not lost during concentration of the fruit solids and the deterioration of the product cannot be correlated with its ascorbic acid loss. What variations there are in the ascorbic acid content of frozen citrus concentrates are affected by the varieties of fruit grown and by the conditions under which they are grown, rather than by any losses incurred in distribution.—J. R. Marshall, *et al.*, *Quick Frozen Foods*, 1955, **17** (12), 50.

THE MANUFACTURE OF
Crystallised Flowers, Candied Peel, Glacé Cherries and Similar Preserves

By Denis Dickinson, M.Sc., Ph.D., F.R.I.C.

The various confections and baker's sundries included under the general description of "sugar preserves" have one thing in common—they all rely for their keeping properties on a high concentration of soluble solids and a low moisture content. In other respects, however, they may differ quite widely and many different processes are employed to achieve the essential high sugar concentration.

Crystallised flowers

Violets. The fresh flowers, freed from calices, are dipped into a heavy syrup and then sprinkled with finely powdered sugar. The sugar adheres to the syrup on the petals, and after removing surplus powdered sugar by shaking on a sieve, the flowers are transferred to an oven at 50 to 60°C. where they remain until dry. A crystalline appearance is induced by a second immersion of the sugared flowers in a hot saturated syrup, where they are left for 12 hr. This is sufficient time for the syrup to cool and deposit fine crystals of sugar on the flowers, which are then removed and returned to the stove for a second drying.

In order to achieve a "natural" colour, the powdered sugar used is coloured with an artificial dye.

Crystallised roses are prepared in much the same way, but require an additional cooking process. This is combined with the first immersion in syrup, after which their treatment continues in the same way as the violets.

It is obvious that these products consist almost entirely of sugar, the original flower providing little more than a framework carrying a mass of sugar crystals. There is also a small quantity of artificial colouring matter and it is important that this material should be suitable for use as a food colour. In addition it should be sufficiently well fixed in the flowers to prevent it spreading and disfiguring instead of decorating the iced cake or other surface on which the flowers are placed. The quantity of colouring matter is probably of prime importance in this connection. Humidity is the only condition likely to cause spoilage of these products and physical spoilage due to the absorption of moisture with consequent loss of texture and shape is bound to precede any biological spoilage.

Angelica

The preparation of angelica is more complicated and more nearly resembles that of citrus peel. It is made from the stems of the cultivated plants which are collected from two- or three-year-old plants during the summer months. Authorities insist that the stems should be cut shortly after dawn!

The flattened stems are first cut into lengths of about 25 cm. and then cooked in boiling water until they are tender. On removal, any external tough layers or strings are pulled off and the prepared stems are thrown into cold water. Further treatment consists of immersion and heating in a series of syrups of increasing concentration, occupying several days. The final syrup strength is 30° Beaumé (measured at the boiling-point of the syrup) and the angelica is boiled in this for a short time. The lengths of stem are then cooled by placing them on a cold slab and are sprinkled with powdered sugar. They may be given a final drying in a stove, but crystallisation of the sugar has to be avoided.

Angelica is not a crystallised product. Its storage presents some problems, since it must not

Stainless steel syruping tanks used for the manufacture of syruped peels.

be allowed to absorb moisture, or it will become sticky, and it must not be allowed to dry or it will become brittle; as it dries, deposition of white crystals of sugar causes an apparent change in colour. It is, in fact, a product that is not intended to withstand long periods of storage.

Candied peel

Orange, lemon, and citron peels are commonly used for the preparation of cut mixed peel. Grapefruit peel may also be employed. The process is somewhat lengthy as it involves a preliminary pickling or fermentation. It is generally carried on as a by-product process by manufacturers of citrus juice products.

Methods of pickling vary considerably, from the Italian, in which the halves or cups of peel are steeped in sea water enclosed in barrels and left until they are sufficiently soft, to the other extreme of the American method in which the peel is packed into barrels, covered with a 22° salometer brine, and left for at least three months. In all cases, however, the object is to achieve a controlled fermentation—the controlling agent being salt or SO_2, or both—which renders the peel soft, but not flaccid or slimy. The flavour, texture, and colour of the final product are determined to a large extent by the preliminary treatment.

After pickling, the peel is immersed in boiling water, the "rag" is removed, and it is then ready for syruping. This may be done either by the traditional slow process whereby the peel is immersed for periods of several days in syrups of increasing concentrations, or by the rapid process in which the peel is first cooked in a dilute syrup and then concentrated in this same solution under vacuum. Syruping continues until the peel contains about 65% of soluble solids, when it is finally drained, cut into short lengths or dices, and packed.

Both photographs in this article were taken at the Durban (South Africa) factory of Tomango, Ltd., by whose permission they are published.

Syruped peel draining on stainless steel tables before cutting.

Glacé cherries

Cherries intended for syruping are preserved in SO_2 solution until required. The inclusion of a small concentration of calcium in the preservative solution is an advantage as it firms the fruit and helps it to withstand subsequent handling. The calcium may be added as whiting or as calcium bisulphite or, when the storage vessel is of concrete, reliance may be placed on dissolution of calcium from the storage vessel by the acid preservative solution.

Methods of syruping vary considerably. A French process of manufacture follows these steps: the preserved fruits are pitted, washed free from SO_2 solution, and then partially dried at a temperature of about 50°C.; they are then covered with a sugar solution containing colouring matter (Erythrosine and Ponceau), glucose, and sucrose having a density of about 36° Beaumé at 100°C., and are left in this solution for a period of several weeks to allow thorough penetration of the syrup.

Modern Canadian practice consists of a process that is half-way between the two extremes of the traditional slow process and a rapid evaporator process. It employs a low temperature (60°C.) and provides for automatic recirculation and concentration of the syrup. Much more accurate control is both possible and necessary. Atkinson, Strachan, *et al.*, have described recent advances with this process (*Food Technol.*, 1952, **6**, 431.)

Manufacturing problems

Since all these products rely for their preservation on their low moisture content, it follows that if they are stored under humid conditions which allow their moisture content to increase, spoilage of some kind is inevitable. The highest concentrations of sugars—and therefore the lowest concentrations of water—are found in the crystallised flowers and fruits. Absorption of moisture by these products is accompanied by physical spoilage, that is to say, the materials lose their characteristic appearance and texture.

Non-crystallised products—glacé cherries, drained peel and angelica—may suffer from more complex troubles. The necessary maximum moisture content to prevent fermentation is surprisingly critical; in the case of glacé cherries it appears to be about 24% and fermentation may take place if it rises to 25%. The occurrence of fermentation in this product is accompanied by the

typical smell of fermentation and the development of opaque patches within the fruit. These patches are due to occluded gas, produced by the yeasts involved. The fermentation proceeds at a very slow rate and it is extremely difficult to isolate the yeasts responsible.

Drained peel is also subject to fermentation, but may contain considerably more moisture before this trouble begins. The critical level of moisture content appears to be about 28%. At this concentration of water, moulds can develop also. By contrast with cherries, yeasts seem to prefer to grow on the surface of peel, which acquires both an odour of fermentation and a white opaque appearance.

Crystallisation of the sugar also spoils goods that are intended to be non-crystallised. This may occur as a result of loss of moisture—*e.g.* if the refractometer solids content of drained peel exceeds 70%—and also as a result of wrong proportions of invert sugar and sucrose. To avoid crystallisation of the invert sugar, the sugars should be proportioned in much the same ratio as in jam, that is to say, the sucrose content should be at least 25-30% of the total sugar content. Crystallisation of invert sugar in drained peel gives rise to a dirty-white external coating which can be mistaken at first sight for yeast growth. To avoid crystallisation of glacé cherries, Atkinson, *et al.* (*loc. cit.*), specify a minimum sugar content of 66%, of which at least one half must be sucrose.

Although dried fruits are outside the scope of this article, it is worth noting that dried prunes frequently develop an external growth of dirty-white crystals of invert sugar. In this case, since no sugar is added to the fruit, crystallisation can only be prevented by maintaining a sufficiently high residual moisture content and preserving the fruit by SO_2.

Laboratory examination

The general remarks outlined above for the various products will indicate the laboratory tests which should be applied to these goods, and the purpose behind the tests. Some supplementary notes may, however, be useful.

When goods show evidence of a white external deposit, it is not safe to rely on a cursory examination to decide the nature of the deposit. A microscopic examination under a low-power objective should always be made. Yeasts, moulds and invert sugar crystals are then readily distinguished, and the presence of secondary predators—mites—may be detected.

Routine inspection of apparently sound goods is usually confined to determinations of the refractometer solids in the expressed juice (obtained by squeezing the fruit in a small bag of fine muslin), total and reducing sugars, and, if the source of the materials is quite unknown, of preservatives. SO_2 is most likely to be present in small concentration in cherries, and may well be found in peel, in both cases as a residue introduced by the processes of preparation. SO_2 may also be used as a preservative applied after manufacture. Benzoic acid is also a strong possibility.

Citrus peel, citron halves, angelica and similar preserves may contain salt. In general, a concentration of 1% of salt is not only allowable, but contributes usefully to the flavour of the product. Concentrations much greater than 1%, however, are not acceptable.

Artificial colour is always present in glacé cherries; a mixture of Erythrosine and Ponceau 3R is normally used. In mixed packs, such as mixed peel, the use of artificial colour is less likely and is normally obvious owing to the extreme difficulty of obtaining an even distribution of one colour in one species of peel only.

Dull or greyish colours in preserves of this kind may be due to contamination with copper during manufacture. As little as 5 p.p.m. of copper may cause this defect in delicately tinted materials. Atkinson, *et al.* (*loc. cit.*), reported that discoloration of cherries dyed with Erythrosine occurs in the presence of 8 p.p.m. of copper, but that Ponceau SX and 3R will tolerate 35-40 p.p.m.

A good indication of the standard of efficiency in manufacture, and incidentally of the probable keeping quality of the material, is given by a yeast count. The number of yeasts present should be less than one million per gm. of material.

Improving Indian sago

Critics of Indian sago who point out that the product is made from tapioca which is nutritionally poor, do not sufficiently appreciate the fact that sago, irrespective of the source, is a processed starch product and cannot be compared with any cereal. So argues the director of the Central Food Technological Research Institute of Mysore in his introduction to a new booklet* published by the Institute. A fairly exhaustive study of the problems relating to the sago industry in India has been made by the Institute and concrete suggestions for its improvement are made. There is need for increased efficiency in the extraction of starch and for the adoption of more hygienic methods at different stages. The establishment of proper standards and regular pre-market testing of the product is also called for.

Besides outlining the origins and present status of the industry in India the booklet gives details of the manufacturing processes and nutritive value of sago. Suggestions for its improvement are made and appendices give recipes for some sago preparations and a list of sago manufacturers in India.

* *The Indian Sago Industry.* 1955. The Central Food Technological Research Institute, Mysore, India. Pp. 35.

The story of sugar, its history and uses in modern life, is told in an attractive colour booklet published by Tate and Lyle Ltd. Primarily the book has been published for the benefit of the visitors to the company's refineries in London and Liverpool. The book consists of 112 pages of articles written in a popular style and is interspersed with interesting facts, hints and suggestions about sugar. It includes several coloured flowsheets of sugar refining and production at Plaistow and Liverpool.

DEHYDRATION OF CARROT

By E. G. B. Gooding, M.A., M.I.Biol., and C. G. Tucker, B.Sc.

(*Ministry of Agriculture, Fisheries and Food, Research Establishment, Aberdeen*)

Carrots do not normally form a large portion of the British diet, but there has been some demand for dehydrated carrot for use by the Services, partly on account of the particularly high provitamin A (*beta*-carotene) content and partly in order to provide variety in the diet: in addition there is a small civilian market. In the past two years investigations at Aberdeen have ranged widely over problems of carrot dehydration, and have included efforts to improve the flavour of the dehydrated product and to produce it in forms other than strips or small dice; a study has been made of ways of reducing losses during processing, and of the possibility of increasing the tropical storage life of the product. These investigations are still at an early stage, but in this article an attempt is made to summarise progress so far.

THE PROCESS for dehydrating carrots is generally similar to that for other root vegetables[1]: the raw carrots are washed, inspected, peeled in abrasive peelers, hand trimmed, mechanically cut into strips or dice, scalded and sulphited, dried by hot air in overdraught driers, and sometimes finished in through draught driers. The product is normally packed in nitrogen in sealed cans, since if the dried material is exposed to air oxidation of the *beta*-carotene to *beta*-ionone is rapid, and within three or four weeks an off flavour and odour resulting from this cause are apparent. The odour is characteristic, sometimes described as resembling violets, and the taint survives cooking, leaving a "perfumed" flavour in the cooked material.

If oxidation during storage has been avoided, the product is normally of bright and attractive appearance, of good texture, and pleasant, even sweet flavour, though sometimes rather lacking in the characteristic flavour of carrots. The main drawbacks in the dehydration of carrot as usually practised are the considerable losses incurred during processing, involving wastage of the food and high costs, and a rather short storage life when the product is kept at tropical temperatures.

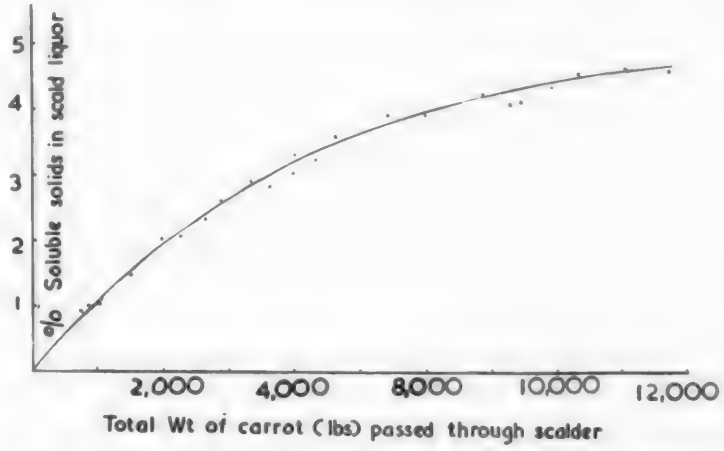


Fig. 1. Water scalding of carrot strips ⅜ in. × ⅜ in. Increase in concentration of soluble solids in the scald liquor with throughput of vegetable.

The raw vegetable

The variety Red Cored Chantenay continues to be favoured by most food processors. Products made from this are usually considered to be attractive because of the generally bright red-orange colour, and desirable because of the higher provitamin-A content associated with the red core.

It has not been possible in the past two seasons to carry out any systematic work on the suitability of different varieties of carrot for dehydration. The general requirements are that the carrots shall be stump rooted, since taper rooted varieties tend to clog the machinery and to suffer excessive preparation losses; that they should be without woodiness and of medium or large size, since wastage is severe with smaller material; that the colour should be bright, whether the carrots are red cored or not; and that the carrot flavour should be pronounced. Satisfactory results have been obtained, not only from Red Cored Chantenay, but from varieties James's Intermediate, Stump Rooted Intermediate and Clucas's New Model Red, though the one consignment of the latter which was handled consisted of roots smaller than generally considered desirable.

As with cabbage[2] the yield of the dehydrated product is closely related to the dry matter content of the raw vegetable: the variation in dry matter content has been from 8·5% to 12·5%. It is obvious that, provided other desirable characteristics are retained, it is important from the dehydrator's point of view for the carrots delivered to the factory to have a high dry matter content. Information on the dry matter content of different varieties is insufficient for conclusions to be drawn, but there

has been no indication in the Aberdeen experiments that the time of year in which processing was carried out has had any effect on the dry matter content of the raw material; carrots have been processed in all months of the year from September to March.

Scalding

The effects of scalding conditions on the yield and properties of the dehydrated product have been studied in some detail. About 70-80% of the total dry matter in fresh carrot is soluble in water, and during scalding in water a high proportion of this soluble material may be leached out into the surrounding liquor. As the concentration of solutes in the liquor rises, the loss of solutes from the vegetable by leaching becomes less. It has long been known that this leaching effect was considerable, and recent experiments have enabled the extent of leaching and its effect on the yield of the dehydrated product to be measured with greater accuracy than has hitherto been possible. Figs. 1 and 2 show the increase in soluble solids concentration in the scald liquor and the corresponding yields of dehydrated carrot strips of 3/16 in. × 5/16 in. cross section; it may be seen that as the soluble solids concentration increased from about 1% to 4·5% the yield of dehydrated product increased by about 30%. This, of course, is a matter of great importance to any manufacturer. Even with this increase in yield, the total loss of dry matter during processing was found to be about 16·5% of that in the peeled and trimmed carrot entering the processing line: of this total, losses during scalding accounted for 12%, the remaining 4·5% being mechanical losses at other points. Further reduction in both these figures was sought; mechanical losses were reduced to about 3% by small improvements in certain details of the plant, and scalding in steam (in the manner previously described for cabbage[2]) instead of in water has so far brought scalding losses to about 8·5%.

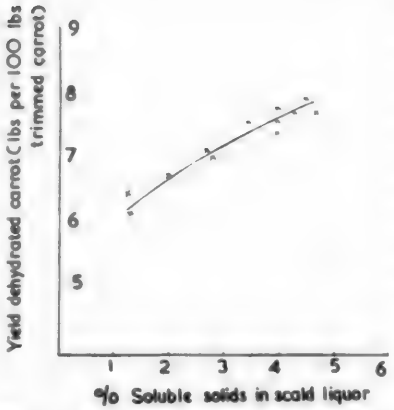


Fig. 2. Water scalding of carrot strips 1/8 in. × 1/8 in. The relationship between yield of dehydrated product and concentration of soluble solids in the scald liquor.

When it is recalled that for a period of several hours, at the beginning of a run, the liquor in a water-scalder is "building up" to its maximum content of soluble solids, the yield of dehydrated product being for all this time below the maximum, it is seen that the advantage of steam-scalding in this respect is greater than suggested by the figures quoted above. From this point of view steam-scalding appears promising, but it has been found difficult, with present experimental techniques, to control sulphiting to give a predictable quantity of SO_2 in the finished product, and further experimental work is under way.

It may be noted in passing that although scalding in steam is the normal practice in some other countries, it has hitherto been little used in Britain: it was tried during the 1939-45 war by the Department of Scientific and Industrial Research in connection with their investigations on dehydration, but since steam-scalding seemed to show no very great advantage over serial water-scalding, of which there was considerably more experience, the latter was installed in nearly all the dehydration factories built at that time, as it was a matter of urgent necessity to bring them into production as quickly as possible.[1]

Carrot strips 3/16 in. × 5/16 in. cross section are the standard at present adopted for Service use and, as was the case with potato strips,[3] represent a compromise between more attractive looking larger portions, which dry more slowly and reconstitute more slowly, and less attractive but more rapidly drying and reconstituting smaller portions. A comparison has, however, been made between the "standard" strips of 3/16 in. × 5/16 in. cross section and strips of 3/32 in. × 5/16 in. cross section, and it was found that when scalded in liquor of high soluble solids concentration (3-5%) the thinner strips suffered about 50% greater loss than the thicker, and gave a yield of dehydrated product some 10-15% less, but when steam-scalding was substituted for water-scalding, the yields of thin strips were similar to those of the thicker strips.

Scalding conditions affected not only the yield of the dehydrated product, but also its flavour, its appearance and its behaviour during storage: this last aspect is discussed in a later section. A rather weaker flavour was associated with the more extensive leaching taking place when carrot strips were scalded in liquor with a low concentration of soluble solids; material scalded at higher soluble solids concentrations, however, occasionally tended to have a slightly "caramelised" flavour. This may have been associated with the condition of the scald liquor which, when kept near boiling at the highest soluble solids concentrations (4·5-5%), gave off a sweet odour resembling boiling marmalade. That the flavour was not solely due to higher retention of solutes in the carrot is suggested by the fact that no batches of steam-scalded material had the caramelised flavour. In general the steam-scalded material had a better flavour than the water-scalded.

The appearance of the dry water-scalded product was always brighter than that of the dry steam-scalded carrot, which was often extremely dull in colour. The difference disappeared on cooking. It should be mentioned in this connection that as a precaution against the development of grey discoloration in the product,[1] sodium dihydrogen phos-

phate has been used, both in the scald liquor employed for water-scalding and mixed with sodium sulphite in the sprays used for dosing during steam-scalding. It is probable, however, that this type of discoloration would not occur in the type of water-scalder used at Aberdeen, which has been designed to reduce metallic contamination to near zero levels, nor should it occur in the steam-scalder, but the matter has so far not been investigated.

In the foregoing paragraphs a comparison has been made between the water-scalding and steam-scalding processes, as practised at Aberdeen. The design of the water-scalder is relevant and it is probable that rather different results would be obtained with equipment of different type. The water-scalder (Fig. 3) is a modified pea blancher, heated by direct injection of steam, and having a liquor capacity at normal working level of about 370 gal. The steam required for heating the vegetable, and for replacing external heat losses, is all condensed in the scald liquor, causing continuous dilution, which more than replaces liquor carried out of the scalder by entrainment with the vegetable, and leads to continuous overflow of 50-100 gal. per hr. when working under normal conditions of loading. Although at 5% soluble solids concentration in the scald liquor this implies a substantial loss of dry matter per hour, it also means that it will probably take 4-7 hr. for the liquor to be completely replaced, and some of the dissolved matter will be held at 98-100°C. for this length of time—which may account for the "marmalade"-like odour already noted, and the caramelised flavour of some of the product.

Overflow may be decreased by lagging the scalder against external heat losses, or by applying the steam through closed heating coils instead of by direct injection: these measures would reduce the dilution of liquor and allow higher levels of soluble solids concentration to be obtained, thereby reducing leaching losses, but the reduced overflow would lead to the retention of dissolved material at high temperatures for even longer periods. A better approach would seem to be the development of a scalder with a greatly reduced volume of liquor. From a smaller surface there would be less heat loss, resulting in less dilution of the liquor by condensed steam and allowing the development of higher concentrations of soluble solids, while, at the same time, the liquor would be changed more frequently, causing less "stewing" of the solutes. It remains to be shown by experiment what effect such changes would have on the product, but there does seem to be much in favour of an alteration in scalder design.

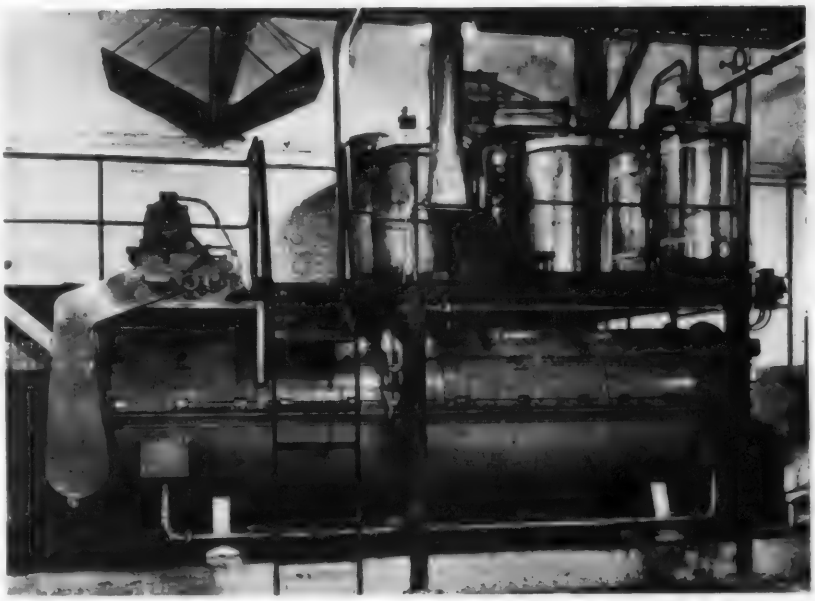


Fig. 3. Water scalder. This is a modified pea blancher, all internal surfaces being of stainless steel. The drive is external, by means of centre shaft. The tanks above the blancher are for the dosing solutions.

Comparison of strips and dice of different dimensions

In addition to comparing the yield obtained from strips 3/16 in. × 5/16 in. and 3/32 in. × 5/16 in. cross section, dice of 3/8 in. × 5/16 in. × 5/16 in. and "half dice" 3/16 in. × 5/16 in. × 3/8 in. were also studied. It has already been mentioned that even at high concentrations of soluble solids in the scald liquor the yield of 3/32 in. × 5/16 in. strips was some 10-15% below that of the thicker strip: typical yields, expressed as pounds of dehydrated product per 100 lb. of trimmed material entering the processing line, were about 8·4 in the case of the thicker strip and 7·2 in the case of the thinner strip, representing a total recovery of dry matter of about 86·5% and 76% respectively. When steam scalding was used the recovery of dry matter was about 88% in each case.

No comparable figures were obtained for dice, since there was a considerable mechanical loss during drying: carrot dice shrink considerably more as they lose water than do potato dice, so that even the dice of dimensions 5/16 in. × 5/16 in. × 3/8 in. were able to fall through the mesh of the drying trays (which was five to the inch), and accurate experimental data were therefore not obtained. Small scale scalding experiments, however, suggested that at the higher soluble solids concentrations there was very little, if any, difference in leaching between either size of dice and 3/16 in. × 5/16 in. strips.

The reconstitution procedure for strips 3/16 in. × 5/16 in. in cross section was to add hot water, soak for 2 hr. and cook for ½ hr. For half dice (3/16 in. × 5/16 in. × 3/8 in.) the period of soaking before cooking could be reduced

to 1 hr. The larger dice (5/16 in. × 5/16 in. × 3/8 in.) required soaking for 4 hr. or longer, or, if the water was kept hot (60-80°C.), soaking for 2 hr. before cooking. The thin strips required no soaking before cooking, but would give a tender product if cooked directly for 20-30 min. In all cases taste panel assessments showed some loss of flavour, with an indication that the thin (3/32 in. × 5 16 in.) water-scalded strips showed the greatest proportion of samples with "weak carrot flavour." Steam-scalded strips 3 16 in. × 5/16 in. cross section were generally regarded as having a stronger carrot flavour than water-scalded strips: there are insufficient data to generalise on the flavour of 3/32 in. thick steam-scalded carrot strips, but since the leaching during scalding is no greater than that for thicker strips, it seems likely that the flavour would not be inferior: the few samples tasted seemed to confirm this presumption.

Both sizes of dice have a definite advantage over the strips in that they have a packing density some 50% greater: 3/16 in. × 5/16 in. strips pack at the rate of 2-2½ lb.* to an A10 tall can, while dice of either size pack at approximately 3½ lb. The thinner strip (3/32 in. × 5/16 in.) has a slightly lower packing density than the thicker strip, *viz.* about 2 lb. to the A10 tall can.

Under similar conditions the thinner strip could be dried to a lower moisture content than the thicker strip: the two sizes of dice came intermediately. With the normal conditions of drying at Aberdeen the thicker strips averaged 5·5-6·5% moisture content and the thinner strips 4·0-4·5% moisture content. Partly associated with this lower moisture content was a longer storage life under tropical conditions for the thinner strips: this will be further discussed in the next section.

* The packing density of strips which have suffered only light leaching (*viz.* scalded in steam or in liquor of high soluble solids concentration) is higher than that of strips which have been heavily leached; for 3/16 in. × 5/16 in. strips the difference ranged from 2½ lb. to 2 lb. per A10 tall can [size 6 3/16 in. diam. × 9½ in. high overall (approximately 145 cu. in.)].

Storage life

When packed in nitrogen in airtight containers, dehydrated carrot will remain palatable for upwards of two years under temperate conditions. The effect of leaks in the can is even more readily detected in the case of dehydrated carrot than with most other dehydrated vegetables, since the flavour and odour of *beta*-ionone resulting from the consequent oxidation of the material are both strong and characteristic. It is not necessary to cook the contents of a can of dehydrated carrot into which oxygen has penetrated for the fact to be ascertained: the odour of the dried product is quite sufficient to reveal whether deterioration has taken place.

Under tropical conditions dehydrated carrot, like other dehydrated vegetables, develops a brown discoloration, with associated off-flavours, and 3-5 months' storage life at 100°F. is probably as much as can be expected from most samples. In recent experiments it was found that material of about 6% moisture content and 600 p.p.m. SO_2 content, and scalded in a liquor with soluble solids concentration 4·9%, became unacceptable because of browning within 2-3 months when stored at 37°C. (98·6°F.). Similar material, but scalded in liquor of 1·2% soluble solids concentration, remained edible for about 6 months under the same temperature conditions. A similar effect due to concentration of solids in the scald liquor was shown by strips 3/32 in. × 5/16 in. cross section, but the storage life at 37°C. was greater, amounting to 5-6 months for material scalded at the high levels of soluble solids concentration, and 9-10 months for material scalded at the lower level of soluble solids concentration. Corresponding storage tests on steam-scalded material have only just been started and results are not available at the time of writing.

It is evident, therefore, that carrot presents a particularly striking example of one difficulty found with most dehydrated foods: if the material is extensively leached during scalding, with consequent reduced yield, wastage of food material, and weakness of flavour, it will have a very much better storage life under tropical conditions than material which has been processed with smaller wastage of soluble material and which has the advantage of greater yield and stronger flavour.

Drying to lower moisture contents may, to some extent, enable the storage life of the less extensively leached material to be increased, and bin drying experiments have been carried out in attempts to reduce the moisture content below the usual figure of 5·5-6·5% for strips of 3/16 in. × 5/16 in. cross section. So far these experiments have not given very encouraging results: the lowering of the moisture content has been smaller than expected.

Investigations carried out by the Department of Scientific and Industrial Research during the 1939-45 war, and more recent work in the United States of America,[5, 6] have shown that the use of a desiccant (calcium oxide), in a porous container packed in the can along with the dehydrated vegetable, continues the dehydration of the packed product and substantially increases its resistance to browning during storage at high temperatures. Experiments to examine the practicability of this technique are now under way at Aberdeen.

Vacuum dehydration

In previous articles in this series[2, 3] it was stated that the technique of vacuum contact plate dehydration had been successfully applied to vegetables. In the case of carrot the products are especially pleasing. It has been possible to dehydrate carrot in the form of slices, 3/16 in. thick, which require soaking in water for only ½ hr. before cooking, and to dry it in the form of dice 5/16 in. × 5/16 in. × 3/8 in., which can be cooked directly without previous soaking in water, to give an

(*Turn to page 460*)

Mobile Laboratory for Danish Meat Research

SLAGTERIERNES FORSKNINGSINSTITUT, the Danish Meat Research Institute, has recently put into use a mobile laboratory for carrying out chemical and analytical work in Danish bacon factories and meat plants. It is intended to be used in connection with the many research projects which the Institute carries out in the various Danish plants. In addition it will be used whenever the operating difficulties make a thorough investigation on the spot necessary.

The laboratory was designed by Mr. K. Teglmand of the Danish Meat Research Institute, and was built in Denmark.

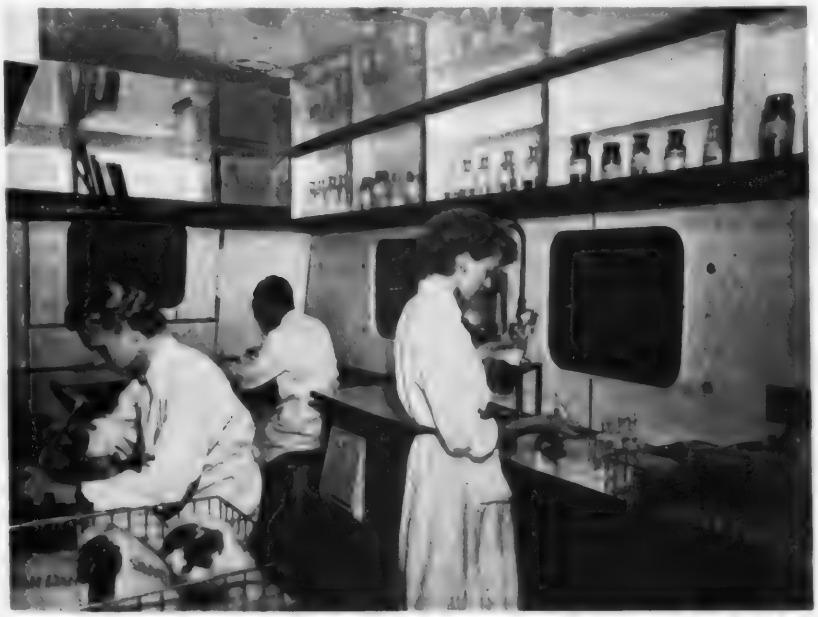
The laboratory is installed in a trailer so that the car used for pulling the trailer can be used separately when the laboratory is stationed for a long period at one plant.

The external body measurements of the trailer are approximately 17 ft. by 7 ft.

On arrival at a factory, the trailer is connected to the water and electricity mains. It also carries two large bottles of gas which are sufficient for most duties and can be refilled anywhere in the country. Other equipment includes a flow type water heater, an electrically operated laboratory incubator for microbiological work and a household refrigerator. There is a stainless steel sink.

Interchangeable cupboard units of the same type used in the Institute's main laboratory have been installed for the sake of flexibility so that, for example, a fully packed unit can be taken from the main laboratory and fitted into the trailer. The design of other cupboard units allows instruments to be securely strapped in, while lighter equipment is placed on shelves and held in place by pressure from shelves above them. Since most work is of a fairly light nature there is no special laboratory fume control, but a ventilator is provided above one of the work benches. The walls are fitted with threaded shelves into which stainless steel rods can be screwed for supporting shelves, distillation and other apparatus. The laboratory is shortly to be equipped with a temperature recording instrument for 16 measuring points. This will be used in testing chilling procedures and in certain canning experiments.

The end window in the trailer can be opened and has sufficient clearance for use not only for ventilation but as an emergency exit.



Interior of the laboratory which is fitted with interchangeable cupboard units of the same type used in the central laboratory.

The British Plastics Federation has published a "Buyers' Guide to Plastics Materials and Machinery and Equipment for the Plastics Industry." This 62-page booklet includes particulars of materials in semi-processed forms such as sheet, tubing, etc. There is also a completely new section dealing with machinery and equipment for the plastics industry. The names and addresses of the member companies supplying each type of material and machinery are given and the trade name used shown. The guide is obtainable from the Federation, 47-48, Piccadilly, London, W.1, price 2s. 6d. (post free, U.K.).

Milk, Cereals, Fermentation Processes

THREE SYMPOSIA AT AMERICAN CHEMISTS' MEETING

At the 128th meeting of the American Chemical Society, the division of agricultural and food chemistry held three symposia dealing, respectively, with dairy products and by-products, cereals, and fermentation equipment and processes. Here are reports of these symposia, together with summaries of some other papers presented before the division.

Dairy Products and By-Products

THE CHEMISTRY OF MILK FAT OXIDATION

M. Keeney (University of Maryland)

Milk fat is unique among the common food fats in its fatty acid composition. It contains a wide variety of acids, some of which, such as the C_{10} to C_{11} monoethenoid acids, are not present in other food fats. The handling and processing of milk fat are distinctly different from the equivalent processes for vegetable and animal body fats. The universal occurrence of oleic acid in food fats tends to make some of the problems of oxidative deterioration common to all the fats; however, the differences in composition and processing of milk fat and other fats dictates that some of the oxidative problems encountered in milk fat are unique.

An early manifestation of milk fat deterioration, particularly in powdered milk, is the development of a coconut-like flavour. The compound responsible for this is δ-decalactone. The development of this compound is associated with the early stages of milk fat oxidation, but it is not known whether the formation mechanism is truly oxidative. Unsaturated carbonyl compounds appear to be responsible for the oxidised flavour of deteriorated milk fat. Work on the Kreis test, as applied to oxidised milk fat, has suggested that β-keto-aldehydes are responsible for the positive test.

FACTORS AFFECTING THE MOLECULAR SIZE OF THE CASEINS

T. L. McMeeking and R. F. Peterson (Eastern Regional Research Laboratory, U.S. Dept. of Agriculture)

The early determinations of molecular size of casein by means of the ultracentrifuge reported from Svedberg's laboratory were inconsistent and indicated that small differences in the method of preparing the casein or in its composition produced large variations in size. It was found, however, that consistent results can be obtained by using the purified electrophoretic components of casein. Thus the sedimentation constants of α-, β- and γ-casein are reproducible, and mixtures give patterns consistent with the sedimentation patterns of unfractionated acid casein or of casein prepared by centrifugation, the calcium being removed by means of potassium oxalate.

It was found that α-casein contained only one component over a wide range of conditions. Both β- and γ-casein contained two sedimenting peaks, the relative size varying greatly with temperature. Thus at room temperature β-casein contained a peak with a value of $S_{20} = 10{\cdot}1$, amounting to 80% of the total area and a peak with a value of $S_{20} = 1{\cdot}7$, while at 6·5° only one peak was obtained with $S_{20} = 1{\cdot}3$. Similar observations have been reported by Sullivan and co-workers (*Arch. Biochem. Biophys.*, 1955, **55**, 455). Similar results were obtained with γ-casein, though the values differed from β-casein, indicating that these proteins are reversible systems.

Ionic strength has a very large effect on the sedimentation constants of the casein components, the value of S_{20} for α-casein varying from 1·00 to 5·7 when the ionic strength is increased from 0·01 to 0·2. Halwer (*Arch. Biochem. Biophys.*, 1954, **51**, 79) studied these aggregates by light scattering.

Data were presented showing the effect of concentration, temperature, ionic strength, interactions and aggregation on the sedimentation constants of casein and its components.

DRIED MILK PRODUCTION AND USE PROBLEMS

A. M. Swanson (University of Wisconsin)

Research problems in the field of dried milk are mainly those of trying to improve the acceptability of the product. With dry whole milk the problem is to make a product which will readily reconstitute with water and be comparable to fresh whole milk. With non-fat dry milk solids, the problem is to make the product meet the requirements of the intended end use. Non-fat dry milk solids for baking must be processed differently than the powder intended for home use.

In the process of making dried milks, milk is subjected to heat treatments of varying intensities and to concentration. These processing treatments result in distinct changes in some of the constituents of milk. The proteins are particularly susceptible to these treatments. The physical-chemical changes in the proteins are very important and considerable research is under way to gather information about them. In addition physical properties of the dried products are important. The powder should readily reconstitute with water. Particle size and fat on the surface of the particle are very important. Large particles free from surface fat are desirable.

CHEMICAL ASPECTS OF FLAVOUR PROBLEMS

S. Patton (Pennsylvania State University)

The acceptability of a food depends largely on its flavour. The practical importance and chemical basis of off-flavours presents a challenge regarding

their identities, mechanisms of formation and means of prevention. The recent identification, in milk or its products of several 2-enals (oxidised flavour), 3-methylbutanal (malty flavour), and δ-decalactone (flavour deterioration in milk fat) attests to the progress being made by researchers. All of these compounds are usually detectable by taste at levels below 1 p.p.m. Their formative mechanisms are highly complex.

The successful use of 2,4-dinitrophenylhydrazine (D.N.P.) reagent in the identification of several off-flavours in milk is noteworthy. Very useful column and paper chromatographic techniques for separating D.N.P. hydrazones are available. Often heating spots from paper chromatograms with carbonyl acids will sufficiently regenerate the parent compounds to permit presumptive identification by odour. Melting point and spectral and compositional characteristics of the purified derivatives usually enable conclusive identification. Such methods are also valuable for the study of non-carbonyl flavour compounds.

Cereals

CARBOHYDRATES OF WHEAT AND OTHER CEREAL GRAINS

R. Montgomery and F. Smith (University of Minnesota)

The aqueous extract of wheat flour contains simple and complex carbohydrate compounds. Chromatographic analysis has shown that the simple sugars and oligosaccharides consist of *D*-glucose, *D*-fructose, maltose, sucrose, raffinose, and oligosaccharides composed of glucose and fructose. The two sugars, sucrose and raffinose, present in high concentration in wheat germ, are very sensitive to the moisture content of the wheat kernel. A rise in the moisture content of the grain results in a change in the ratio of the two sugars as well as a decrease in the sum total of the two.

The pentosan, or hemicellulose, extracted from wheat flour with water is composed of *L*-arabinose and *D*-xylose which are united glycosidically to give a highly branched polymer. A similar pentosan is present in rye and barley flour and also in the "squeegee" fraction of wheat flour.

The aqueous extract of flour also contains glucofructosans, one of which is composed of units of *D*-fructofuranose joined by 2,6-glycosidic bonds. The *D*-glucose is present in the polysaccharide in the pyranose form and together with one of the fructose units represents a sucrose template to which the remaining fructofuranose units are presumed to be attached by enzymatic synthesis in the plant. The structure of the glucofructosan, levosine, extracted from rye grain, has also been established and falls into the same structural pattern as the glucofructosan extracted from wheat.

Hydrophilic properties are conferred upon the barley grain by a polyglucosan which has gum-like properties. This carbohydrate polymer is composed only of *D*-glucose units which are joined by β-glycosidic bonds. Half of the bonds are of the 1,3-type and the other half are of the 1,4-type. A gum-like polysaccharide present in oat flour has been shown to be structurally related to the lichenin polysaccharides.

A number of the more complex carbohydrates do not occur in the free state. Thus, certain isolated polysaccharides are frequently soluble in water yet they cannot be extracted with water directly from the grain. A case in point is the glucurono-araboxylan extracted from the hulls of maize kernels.

Fundamental studies of the chemical constituents are not only important for a further understanding of the present uses of cereal grains but also for the development of their industrial chemical usage.

THE PROTEINS OF WHEAT FLOUR

J. W. Pence, D. K. Mecham and H. S. Olcott (Western Utilisation Research Branch, U.S. Dept. of Agriculture)

The elastic, cohesive properties of the proteins of wheat gluten are basically responsible for the characteristic porous structure of leavened baked products, but the chemical composition and structure responsible for these unusual protein properties are as yet ill-defined.

The limited solubility of gluten in suitable solvents has restricted the usefulness of the principal physicochemical methods of investigation. However, ultracentrifugal, electrophoretic, and viscosity studies suggest that gluten is a system of several highly interacting components or an extremely complex mixture of components differing gradually in properties from the more or less insoluble "glutenin" portion of gluten to the more soluble "gliadin" portion.

Gum gluten is thought to form only when flour is mixed with water and then mechanically worked. Some of the glutenin components appear to occur in complex with lipides in flour and to form additional complexes when flour is made into a dough. Gluten as ordinarily prepared contains 5 to 12% lipides and the physical properties of doughs can be affected materially by certain types of added lipides. Similarly gluten properties can be markedly affected by reducing reagents.

Glutens from flours of widely varying baking properties are uniform in amino acid composition. Likewise, doughs reconstituted from a common starch and glutens from different flours all baked into uniformly poor bread. Upon restoration of the soluble, non-gluten proteins, however, varying degrees of improvement occurred. The non-gluten proteins, particularly the albumins, can thus modify the baking properties of glutens markedly and may contribute much to the variability among flours.

The non-gluten proteins consist of at least three globulins and 11 albumins. The albumins appear to differ little in molecular weight but are electrophoretically distinct. As a group they contain appreciably more tryptophan and cystine than other wheat proteins. Proportions of the individual components in albumin preparations from flours of durum wheat differ characteristically from those derived from club and common wheat.

Fermentation Equipment and Processes

THE TESTING OF FILTERS FOR PHAGE REMOVAL

J. W. Almlof (University of Illinois) and H. L. Sadoff (Michigan State University)

This paper describes apparatus suitable for the testing of bacteriophage removal by fibrous or granular filters which are routinely used in the fermentation industry for the sterilisation of air. These filters cannot be constructed as sieves, capable of removing all suspended materials, but instead are designed to permit the penetration of only a small fraction of the incoming aerosol. Because of the potential importance of phage infections in submerged culture techniques, it is necessary to determine the operating characteristics of filters with regard to the removal of particles of less than 0·1-micron diameter.

A homogeneous aerosol of "naked" coliphage T-2 was prepared by atomising purified virus suspensions into a dry air stream. The phage particles were tagged with radioactive phosphorus which served as a tracer and eliminated the need for maintaining viability of the virus.

Test filters of various porosities were made from mats of *Pyrex* No. 800 glass wool, and the aerosol stream was sampled before and after passing the test filters. The phage particles were deposited on thin glass slides in thermal precipitators and were then counted with an end-window Geiger tube.

Penetration data for various porosities and flow rates were presented. Brownian diffusion appears to be the principal mechanism of collection.

EQUIPMENT FOR SMALL-SCALE FERMENTATIONS

C. L. Kroll and S. Formanek (Squibb Institute for Medical Research), A. S. Covert (American Cyanamid Co.) and W. E. Brown (Squibb Institute for Medical Research)

In fermentations, as in many other chemical processes, the use of small-scale equipment for process development is advantageous since, on the basis of total expenditure for labour, equipment, raw materials or physical space, information obtained is inversely proportional to tank size. On the other hand small fermentors have the drawback that the per cent. volume loss from sampling and evaporation, particularly over long periods of time, can be appreciable. Furthermore, some special sterility problems are often encountered.

In the 10-gal. stainless steel fermentors described the bottom valve, a frequent source of contamination, was eliminated. In addition, all-welded piping was used to minimise pockets formed by threads. Mechanical seals, in place of stuffing boxes, were also found to be advantageous. Auxiliary equipment for these fermentors includes apparatus for humidifying process air, an electrical probe-relay-pump system for foam control, and a sterile metering system for slurries such as inoculum and medium.

Finally, the same equipment has been modified slightly and used for continuous fermentations. Sterility has been maintained for as long as two months even with hourly addition and withdrawal of material.

OXYGEN UPTAKE CONTROL IN A DEEP TANK FERMENTATION

Ping Shu (National Research Laboratories, Saskatoon, Saskatchewan, Canada)

This paper describes a method by which the oxygen utilisation of a deep tank fermentation may be controlled to follow a prescribed schedule. A recording oxygen analyser is used to determine the oxygen content of the effluent gas from the fermentor. With a constant air flow rate, the difference between the oxygen content of the air and that of the effluent gas represents the rate of oxygen consumption by the fermentation.

The oxygen utilisation schedule, expressed in terms of oxygen concentration of the effluent gas, is drawn on the recording chart. The oxygen consumption rate of the fermentation is compared continuously with the schedule. Whenever the difference exceeds a given limit, a sensing element attached to the pen carriage of the recorder actuates a relay to adjust the stirrer speed of the fermentor in order to nullify the difference. Thus the rate of oxygen utilisation of the fermentation is forced to follow that of the prescribed schedule.

This method is adaptable to any deep tank fermentor with variable speed agitator, and is especially suitable for large fermentation vessels.

General

COMPOSITION OF ELEVEN FROZEN FRUITS

M. Burger, L. W. Hein, L. J. Teply, P. H. Derse and C. H. Krieger (Wisconsin Alumni Research Foundation)

The nutritional composition of 11 frozen fruits is expressed in terms of 21 values for vitamin, mineral, and proximate components. These include reduced and dehydroascorbic acid, β-carotene, folic acid, niacin, pantothenic acid, riboflavin, thiamine, vitamin B_6, calcium, iron, magnesium, phosphorus, potassium, sodium, solids, ash, ether extract, protein, crude fibre, carbohydrate, and calories.

A statistical sampling plan was employed in saving 120 sets of samples, consisting of some 3,500 packages from commercial production in 55 freezing plants within representative areas throughout the U.S.A. during the 1953 and 1954 packing seasons. Entire package contents of each set were assayed. Results show that strawberries are a good source of vitamin C. All fruits except apples contained very little sodium. Average carbohydrate content of the 11 fruits was found to be about 22%. Some samples were packed without added sweetener. Data on vegetables, concentrated juices, and amino acids will follow as part of the nutrition research programme of the National Association of Frozen Food Packers.

This programme greatly enlarges the scope of available nutritional information on processed perishables. Information on the nutritional composition of frozen foods will be of considerable value to nutrition scientists, dietitians, and home-makers in planning well balanced diets.

(To be concluded next month)

New Dairy Plant and Equipment

Besides a display of the most modern equipment for producing, processing, and distributing dairy products, the 60th annual Dairy Show at Olympia last month included exhibitions of and competitions for equipment, poultry, produce and cattle. A successful innovation was the holding of daily talks, film shows and demonstrations on bacon production, butter and cheese making, dairy machinery, research in dairying and many other subjects. Among the trophies and awards were silver and bronze medals for new apparatus, particularly that effecting saving of labour, in six classifications covering production and distribution in dairying, incubation and brooding, poultry, the ice-cream industry and agriculture.

PASTEURISERS, homogenisers and refrigeration equipment were shown by the **Creamery Package Manufacturing Co. Ltd.** Among the pasteurisers were flat plate and separate seal heat exchangers for pasteurising, cooling and pre-heating milk, its derivatives and fruit juices. Two H.T.S.T. pasteurisers were on the stand, one a 1,000-gal. hr. model with electrical instrumentation and the other a 200-gal./hr. unit with auxiliary equipment.

The *C.P. Multi-Flo* homogeniser incorporating the expendable single service valve was exhibited. The valve is made from a single strand of stainless steel wire compressed into a cone. It is said to allow low pressures to be used, thus reducing running costs and wear on the machine.

The *Sabroe* soft-ice machine for chilled water production and a full range of ice-cream equipment were also shown by Creamery Package. The latter included continuous freezers incorporating such modifications as independent input and output, mix-pump speed control and solid drawn and stainless steel freezing barrels. Other exhibits on their stand were the *Multi-Pass* ice-cream mix plate cooler, a range of pasteurising, aging and flavour vats, the former incorporating a high-speed agitator, and a fruit feeder of 120 gal. maximum capacity.

Prominent on the **A.P.V. Co. Ltd.** stand were various types of *Paraflows*, arranged for a variety of duties, together with complete *Paraflow* H.T.S.T. pasteurisation plants. The latter were in two types, HMB-P for 500-2,500 gal. hr. and HX-P for 100-800 gal. hr. Other exhibits on this stand included a section of the *Heil* refrigerated tank and two examples of the Manton Gaulin homogeniser. The recently announced semi-permanent type of stainless steel pipe fittings designed for in-place cleaning were shown for the first time.

Cheese wrapped by the new Venesta method.

An interesting exhibit on the stand was the completely automatic *Lanfers* milk reception unit. This is a Dutch plant which is being sold in this country by A.P.V. Using electronic devices, the churns are conveyed, unlidded, emptied, washed, sterilised, re-lidded and returned to the lorry and the milk is sampled and weighed without any human handling. A single operator in a glass-fronted room supervises all operations. It is said that it is virtually impossible for the plant to make a mistake.

T. Giusti's 25-gal. Pastomix.

The A.P.V. display was completed by exhibits of their cream treatment unit, stainless steel milk pumps, measuring churn filler and two types of samplers—*In-line* and *Vacumatic*—that had not been seen before.

Industrial and commercial compressors and condensing units suitable for all refrigeration duties in the dairy and ice-cream industries were shown by **York Shipley Ltd.** Among them were representative examples of water and air coolers and a sectional economiser condenser.

Equipment shown by **G. and J. Weir Ltd.** included four examples of their range of refrigeration compressor, three types of homogeniser and a direct-acting boiler feed pump. Among them was an ammonia compressor which is a compound machine for use where the compression ratio would be excessive for the single-stage type. The design is said to offer a saving in power because of the lower compression in the individual stages and is particularly suitable for quick-freezing plants, ice-cream and other types of hardening tunnels.

An "in-churn" milk cooler was shown by **Alfa Laval Co. Ltd.,** who also displayed a new lower priced milk cooler. Dairy accessories on their stand included strainers, cream pans, separators and filter media.

One of the latest models of their *New Supreme* fully automatic hydro bottle washer was shown by **Dawson Bros. Ltd.,** working in conjunction with *Dawson-Express*

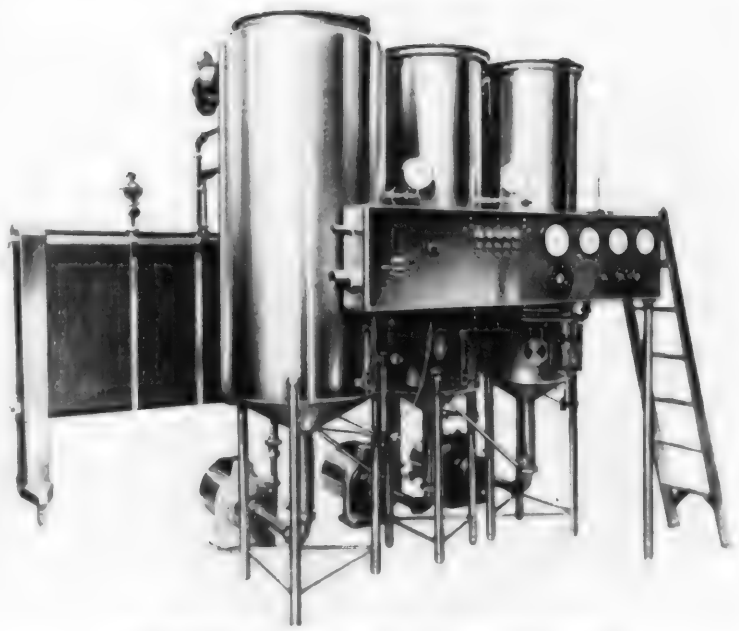
patent automatic bottle decraters and recraters in a closed cycle. Special features of this bottle washer include nylon bottle holders, variable speed drive which gives synchronisation with the filling machines, a Geneva-motion gearbox which gives accurate centring of the bottles over the jets and an air-operated clutch.

Instruments for H.T.S.T. and vat pasteurisers were shown by **Taylor-Short and Mason Ltd.** (formerly Short and Mason Ltd.) together with a range of indicators, recorders and controllers for general use.

Three fillers and cappers were shown by **Albro Fillers and Engineering Co. Ltd.** They were the Model P.156 with *Albro* capper, capacity 750 gal./hr.; Model S.308, a combined 30-head filler and 8-head crowner for sterilised milk capacity 1,000 gal./hr.; and Model G.V.61, a combined 6-head filler and capper for handling milk or fruit juices in the small dairy. Its capacity on 1 pint bottles is 2,160 per hr. A rotary powder filling machine was also exhibited.

Clarke-Built Ltd. showed the *Orange Converter* orange drink machine for which they have been appointed sole concessionaires by Northern Dairies Ltd. They also showed a full range of ice-cream equipment including the new Benz and Hilgers *Benhil* brick forming and wrapping machine, *Vogt* freezers, the *Vacreator* fruit feeders and the *Ripple* ice-cream machine. The chief item of interest in their dairy equipment shown was the latest *GRA-VAC* bottle filler with built-in Fords capper.

A complete ice-cream factory layout was exhibited by **T. Giusti and Son Ltd.** Other equipment for the ice-cream industry included the company's range of $5\frac{1}{2}$ gal. freezers, including a pressure model and soft ice-cream freezers which provide ice-cream on tap eliminating packaging and handling costs. The *Pastomix*, a vessel in which an ice-cream mix is pasteurised, emulsified, cooled and stored ready for freezing, was on display in 10, 25 and 50 gal. sizes. Chocolate dipping pans, baggers and a treadle brick cutter were also to be seen.



The completely automatic Lanfers milk reception unit.

Exhibits on the **British Hydrological Corporation** (Industrial and Commercial Detergents Ltd.) stand included a range of dairy detergents, quaternary ammonium compounds and the B.H.C. 206 milk stone remover.

A 10-gal. milk churn—the *Grundycan*—was displayed by **Grundy (Teddington) Ltd.** The churn is made from heat-treated aluminium alloy and is claimed to require no maintenance. It is guaranteed against manufacturing defect and weighs only 15 lb.

The applications of electricity on a typical farm (with a herd of 30 cows using the bucket milking system) were shown on the **British Electrical Development Association** stand.

The ways in which gas and coke fired equipment can provide steam and hot water for the modern dairy were featured by the **Gas Council.** The equipment on their stand ranged from instantaneous water heaters to boilers. It included steam-raising boilers, a steam-heated pasteuriser and overhead panel heaters. A photographic display showed other uses for gas and coke in dairies.

Visitors to the **Polak and Schwarz (England) Ltd.** stand were able to taste yoghurt flavoured with a range of new essences and extracts. The company also displayed flavours for ice-cream and a range of concentrated fruit syrups.

Essences, fruit juices, colours, ripple concentrates, ice-lollie compounds, flavour emulsions and associated materials were displayed by **W. J. Bush and Co. Ltd.** A wide range of flavoured ice-creams and ice-lollies enabled "on-the-spot" choices to be made.

Waxed and treated paper cups, suitable for cream, ice-cream and other dairy products were displayed by the **Gee Manufacturing Co. Ltd.** The company also showed treated paper cups for hot or cold beverages, with snap-on paper covers and composite containers made from spirally wound paper bodies with metal ends, supplied with a variety of protective liners and closures.

Venesta Ltd. turned their stand into a replica of a Georgian shop to display their new synchro-print and fruit-flavoured milk capping strips, together with butter wraps and a new method of cheese wrapping. In the latter, heat-sealed

(*Turn to page 466*)

Packaging Machines: Users Quiz Makers

Forthright criticism of packaging machinery ("more suitable for bricks than biscuits") was answered equally forthrightly when biscuit and confectionery manufacturers met the makers of packaging machines at a discussion meeting promoted by the Southern Area of the Institute of Packaging recently. Here is a report of the main points made by both sides.

THE chief issues which emerged during the discussion were (*a*) the unwillingness of machinery makers to develop special machines, and (*b*) lack of co-ordination or standardisation in conveyor or table heights and working speeds, leading to difficulties in integrating individual machines from different companies into flow lines. Good reasons were advanced by the machinery makers in each instance for the apparent deficiencies in their methods.

Mr. P. L. Bilham (Symbol Biscuits Ltd.): Biscuits are the most demanding goods in their packaging requirements. They are fragile, very sensitive to moisture and contamination, unstable to handle, variable in dimensions, and the unit price is very low. All these factors make for difficulties. Biscuits need mechanical protection if they are not to be broken in handling or crushed by static loading of one package on another. Corrugated paper has for many years been the traditional cushion for the first purpose, but it is no use for the second. For this some sort of carton has to be used, and lately the two have been combined. Even then, the unit pack has to be assembled in a multiple pack and given protection against soiling and further stability for stacking and handling. In this mechanical aspect alone the picture is already quite complicated. Only the very efficient moisture-vapour proof materials are good enough for biscuits, which are avid of moisture and may have to be on the shelf over long periods. Generally, such properties are only to be found in laminates, which must also be efficiently heat sealing and capable of carrying good colour printing. Thus, a complicated set of properties is demanded here as well.

Little need be said about the difficulty of controlling a stack of biscuits, either horizontally or vertically, except to point out that the shape may be round, oval, rectangular or hexagonal, and the surface heavily embossed or blistered in the baking. It is less well-known that biscuits, produced in thousands on modern automatic band plant, are alike as two peas until they are measured, when you will find considerable variation. Biscuits are also cheap; a ½-lb. pack may cost, on the average, 10d. to 1s. to retail, and out of this the packer has to provide all the above properties in his materials. This is very different from the radio set or bottle of scent, whose packaging costs far more but is easily absorbed in the high priced article, and which is not produced at about the rate of 60 units per min. which, in a medium-sized factory, means about an eighth of a million a day, with its consequent multiplication of any decimal of a penny for the cost of any packaging material. It is a far cry from a machine that will wrap a bar of soap in a folded paper wrapper secured by a spot of gum to the machine that will wrap a stack of biscuits in heat-sealing, laminated moisture-vapour proof material.

The ideal machine

I should like to say that we have such a machine in a state of perfection; but I am afraid that we have not. We are asking for a machine to take over from the human machine, with its power of correlation of eye, feeling and muscle, which has become too expensive for us to use. The human machine is fallible, but it can correct its own faults if it wishes. It is to be expected that a packaging machine will suffer by comparison. We want, too, a machine which will collect ½ lb. of biscuits in a stack, sense that they are longer or shorter, wider or narrower, deeper or shallower, register the design on the wrapper to suit, adjust tucking devices, heaters and compression stages, give us a perfect sealing without ruining the moisture-vapour proof properties of the material, at a speed to suit the output of our baking units, and give us the minimum of scrap in biscuits and packing material. Some machines do some of these things some of the time; no machine I know will compensate for the varying length of a stack of biscuits. The bread-wrapping type will compensate for the girth by pulling off the correct amount of paper to suit, but there is no possibility of registration. Some machines take cut sheets and achieve registration on variable packagings, but cut sheets are more expensive and more difficult to handle than reels.

The perfect seal is most important, for it is a pure waste to use a high-class moisture-vapour proof material and have a hole in the seal; such a hole will pass 100% of the moisture presented to it and, even if it covers only 0·1% of the total area of the package, allows in as much moisture as the 100% area with a moisture-vapour permeability of only 0·1%. All such packages are bad packages, cause bad biscuits, bad publicity, and bad sales—and must be eliminated. The cost of doing this and unpacking the biscuits, with the resultant waste of packaging material, can be a heavy burden even if it is only 1% or 2%, considering the total number involved. Quite a few wrapping machines running at 60 strokes per min. have only one heating point; the package can be there for a fraction of a second and a very high temperature is necessary to melt the heat-sealing material. Would it not be better to have two or three heating stages and bring the temperature up gradually?

Can we not have thermostats controlling the heat instead of reactive energy regulators? If the flow of packages through the machine is irregular, then it is constant temperature we want and not a constant flow of heat. Many modern machines stop holed packs in the heating zone, and I have seen machines which resemble fish fryers in action!

Again, modern machines have been simplified to some extent by allowing a long chain of packages to be pushed through the machine instead of transporting each package separately. This may be all right for bricks, but it is very hard on flimsy cartons, causing distortion and bad wraps. Another misleading thing about machines is their stated speed. A machine may be capable of wrapping bricks in thick paper at a theoretical speed of 60 per min., but in practice it will only average about 48 per min. throughout a normal day, what with stoppages, breakdowns, minor adjustments, changing of reels, etc. An 80% efficiency is the figure to budget on. Now if that machine is wrapping a flimsy rectangular carton, unsupported by its content of round biscuits, with a stiff, laminated material, difficult to seal, at 60 strokes per min., there may be chaos. At 45 strokes it will probably run comparatively smoothly, although even then the factor of 80% efficiency must still be applied to get a realistic output. Thus, if your baking unit is turning out 60 ¼-lb. units per min., you need two wrapping machines instead of one.

High cost of development

Mr. C. J. Hopkins (Autopack Ltd.): A machine can be made for almost any purpose but there are two difficulties: (1) users do not like paying the price, and (2) many users do not have the factory staff to maintain a really difficult machine, and of course the more that is put into a machine the more hazards there are to overcome and the more maintenance is necessary in the user factory. In these days of high labour costs, development work is without doubt the biggest factor we have to face—and many machinery factories can show a heap of scrap iron which represents something between £500 and £1,000. This has to be paid for. If the user has to pay "£X" for the machine and a further "£X" for its development he will tell you: "It will take forty years to recover the cost. We cannot afford it." However, when we as machine makers are asked for a special machine, we are prepared to have a go if we can see a market for a certain number of these machines which will enable us to recover our costs. A look at the packaging machinery industry in this country since the war will show, particularly in patents registered, that it has tried very hard to give users what they need. But the thing which would help more than anything else is a degree of standardisation in packaging. That would allow us to make machines in greater numbers, and help users in their supplies of materials. It should cheapen the cost of wrapping materials, and also enable us as machine makers to give better deliveries, because it is the special machine—the "one-off"—which holds us up.

Undecided customers

Another difficulty in the package using industries is the indecision of those who have a machine on order. When the machine is 90% finished the customer will often say: "We want to do so and so. Can you add it to the machine?" It is like putting a third leg on a baby—very difficult. If we try, it may be 100% successful, or only 50% successful, but unfortunately the only part of the machine that will be noticed is the part that may not be working properly. To achieve a more uniform type of machine we must have a more uniform type of pack, and there we are up against packs that have been known for generations. Users will not abandon them because they think their sales will suffer, and machines have to be designed for impractical packs. If the two sides could get together collectively, and not as individuals, to sort out the best method of packing in each trade or industry, it would go a long way towards overcoming the difficulties of both sides.

Extravagant claims

Mr. Cyril Saper (M. Saper Ltd.): One of our main grumbles against machinery makers is that they will persist in making extravagant claims as to the output of their machines. We are told—to quote the worst case—that a machine will do so much in a working day, but find that the machinery manufacturer must have been thinking of a 24-hr. day and not the normal 8-9 hr. The result is that we either have to put in two or three machines, or go back to hand labour which is nearly as efficient, if given good operators. Then, on the question of size variation, I find that machinery makers often test their machines with nice pieces of wood which they can wrap very successfully, or that they rely on a counter or similar device which tells them that the machine is operating at so many hundred per min. When the machine gets to the user's factory, it is a very different story, and we are then told: "If only you had given us the correct sizes you would have got the proper result." On a product such as ours, we can never guarantee precision for each sweet. Then again we are told: "If your products were not sticky they would fly through the machine according to our specification!" Another will tell us: "Why must you put twisted ends on your sweets?" Apparently, a nice smooth sweet would roll down the chute and fall into its proper place with no trouble at all. It seems therefore that until we get mathematical certainty of size we are always going to have this trouble—and we must discount very considerably the machinery maker's estimate of his machine's capabilities.

On this business of trying to obtain a machine which will do a job not in the normal machinery maker's range, we sometimes have to seek far and wide, all over the world, and finally end up doing the machinery maker's job by de-

veloping one ourselves. We have to attack a manufacturer very forcibly to get him to develop a machine for us. When, however, new machines are being developed, I think they should be put in a customer's factory for try out, providing always that it has been developed to a point where it will not interfere with that factory's output so as to make a shambles of the whole factory and waste valuable materials. I think if we all co-operate, and not merely blame the firm that makes the packaging materials, we should advance a bit further.

Development at customer's works

Mr. C. J. Hopkins: We have tried working with user's samples, but have found that the material which reaches us is not the same material which is packed in the factory. By the time it has been delivered to us all the air has gone out of it, moisture has been picked up, and it is more dense. It may feed beautifully through our machine, but when the machine gets to the place the product is made it has to work on a product straight from the mixer, full of air, and so on. The result is that instead of a certain quantity feeding nicely into the container, a larger pack is wanted. I think that anyone who buys a new machine must realise that a certain amount of development work must take place in his own works, where alone the right conditions for that product can be found.

Mr. T. A. S. Johnson (Charles Douglas Ltd.): The customer can, if he has any doubts, purchase a machine on condition that it is inspected in the manufacturer's factory and that it is not accepted until it works satisfactorily in his own factory.

Mr. Denning (G. D. Peters Ltd.): It is not unknown that when we have worked to a customer's samples that the bottles, cartons, etc., actually used by the customer do not tally with those samples. I have been surprised to find that for many nationally known products the packaging items are not bought to specification but "as per sample attached." Where variations occur we are told that the samples were from one source and the supplies in use were from another source.

Discussion

Opening the discussion "from the floor" *Sq.-Ldr. Pollard* suggested looking at the problem more objectively. For instance, were we trying to make one machine do too much. In other words, had they lost sight of the original problem of, say, producing biscuits and subsequently getting them into the condition in which they could be marketed easily and attractively. Could not such a series of operations be examined individually. They might then get a reasonable amount of uniformity of certain portions of the machines. They could learn much from the cotton industry where nowadays, instead of making one machine do a multiple process, they go to the reverse and use comparatively simple machines with one or two operators looking after two or three of them. In packaging, they were going the other way, with several operators serving one machine.

Mr. C. J. Hopkins: That brings us back to the point of how uniformity would help. In biscuits, for instance, one can have many similarly named objects which are very different in appearance and texture. Thus, if one special machine were developed there would quickly be a need for a second special, and so on.

In the subsequent discussion other speakers dealt with:

(1) Customers who start off by ordering a simple device to do one operation and end up by adding so many other operations that the device turns out to be a complicated machine;

(2) The difficulty of quoting a speed of output which will encompass the best and the worst performance capability of a machine without frightening off the buyer in this or that industry where conditions are different;

(3) The possibilities of using basic movements and units from a machine, if obtainable, for incorporation in something which the user can develop himself to suit his own purposes;

(4) Whether there is a real necessity to use materials of high moisture-vapour barrier performance for biscuits, with all the attendant difficulties of perfect sealing, when something adequate for a shelf-life of six weeks might be enough; and

(5) The specification of cartons for use on setting-up machines, on which a report has been made by the Institute.

New Light on Food Storage

There is no such thing as a "non-perishable" food decided a conference held under the auspices of the U.S. Army, whose proceedings were published recently.* However, the conference recognised that, while foods are perishable, some are more perishable than others, and devoted itself to the problems of storing and transporting semi-perishable products. Dealing in particular with the rate and extent of deterioration of packaged rations during storage and transportation, the effect of atmospheric changes on packaged rations, and a comparison of the economics of cold storage and dry storage of field rations, the findings presented at the conference stimulated fresh interest and in many cases a new outlook on these problems. It was brought out, for example, that even a moderate lowering of storage temperatures could effect considerable prolongation of shelf-life and a reduction in turnover requirements, while refrigerated storage would markedly extend the shelf-life. Although no fundamental change has been or could be made in the overall pattern of depot operations, the possibility of re-locating food storages to take advantage of climatic conditions more favourable to food is being freshly examined by the U.S. Army.

* *Establishing Optimum Conditions for Storage and Handling of Semi-Perishable Subsistence Items.* Q.M. Food and Container Institute for the Armed Forces, 1819 West Pershing Road, Chicago, U.S.A. Pp. 130.

The Determination of Salt in Brines, Pickles, Salted Meats and Seasonings by Titration with Mercuric Nitrate Solution

By Zygmunt Schonherz

(*National College of Food Technology, London, E.C.1*)

WHEN salt is titrated "direct" in used meat brines with silver nitrate solution it is somewhat difficult to detect the exact end-point and some doubt has been cast on the accuracy of the method in view of the fact that protein is present. In addition, the Volhard method, which is usually considered to give a greater degree of accuracy, possesses the disadvantage as far as routine work is concerned that it is too time-consuming. Efforts were made, therefore, to evolve a technique which combines simplicity with accuracy and it was decided to adapt the method proposed by Schales and Schales[1] for the estimation of small amounts of salt in biological fluids. In the method described below the use of microchemical apparatus is avoided and several hundred determinations have shown that a high degree of accuracy is possible.

The principle of the method involves the titration of chloride with mercuric nitrate solution of a suitable concentration. The mercuric ions combine with the chloride ions to produce mercuric chloride ($Hg^{++}+2Cl^{-}\rightarrow HgCl_2$), which does not precipitate but is so slightly dissociated that the end-point of the titration can be recognised by using an indicator which forms a coloured complex with the excess of mercuric nitrate. For this purpose, diphenyl carbazone is suitable as it produces an intense violet-blue colour when excess of the standard solution is present.

For brines it was decided to make a 1:1 dilution if the salt concentration exceeds 10%, but for lower concentrations no dilution is necessary. For seasonings and salted meats a 1 in 10 dilution (10 g. / 100 ml. solution) was found to be suitable.

Reagents.—*Standard mercuric nitrate solution (approximately M 11).*

30 g. of mercuric nitrate ($Hg(NO_3)_2$) is weighed out accurately and 200 ml. of distilled water and 20 ml. of 2N nitric acid are added. After dissolving, the solution is made up to a litre with distilled water. The solution is standardised against sodium chloride and the concentration should, if convenient, be adjusted so that 1 ml.≡0·01 g. NaCl.

Diphenylcarbazone indicator

0·1% diphenylcarbazone in ethyl alcohol. If the solution is stored in a dark bottle and placed in the refrigerator it should keep for at least three weeks.

Procedure.—2 ml. of brine or prepared solution are pipetted into a 100 ml. conical flask and 1 ml. of the diphenylcarbazone indicator is added. The standard mercuric nitrate solution is then added from a 50 ml. burette until a violet colour is just formed. The liquid should be kept well mixed throughout the titration.

Assuming that 1 ml. of the mercuric nitrate solution is equivalent to 0·01 g. of sodium chloride and that 2 ml. of test solution is used for the titration:

$$\text{Percentage of salt present in the test solution} = \text{Titration (ml. of mercuric nitrate solution)} \times 0{\cdot}5$$

In the writer's opinion, the method described combines simplicity with accuracy and, as boiling and filtration are dispensed with, it is possible to carry out the complete determination on brines in about 5 min. There is also a considerable saving in cost when compared with the more conventional methods, which employ silver nitrate.

I wish to express my thanks to Messrs. D. Pearson, B.Sc., F.R.I.C., and D. Napier, B.Sc., for their kindness in checking the results.

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[1] I. O. Schales and S. S. Schales, *J. Biol. Chem.*, 1941, **140**, p. 879.

Dehydration of Carrots

(*Concluded from page 450*)

attractive looking and tender product. The moisture contents of vacuum dried carrot have not been as low as theoretically possible[4] but they have been rather lower than those of the corresponding air dried material.

Compression

During the 1939-45 war a technique was devised for compressing dehydrated carrot,[7] based on the fact that when dehydrated carrot strips were heated to 120-130°F. they became plastic; they could then be compressed in any suitable mould to form a coherent block with little or no fragmentation. Strips comprising these blocks readily separated when the block was immersed in hot water. This technique has been re-examined and has been found to give completely satisfactory results. The finished blocks have a density of about 1·0 and the material may be packed at the rate of 7½-8 lb. per A10 tall can, compared with 2-2½ lb. for the loose strips, representing a very substantial saving in space and in the cost of packing materials necessary for a given quantity of the foodstuff. All forms of dehydrated carrot may be compressed with equal readiness, whether air dried or vacuum dried, and compression has no adverse effects on the culinary quality of the product.

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Dundee's Newest Cannery

THE three main lines at their new Dundee factory are capable of filling over 100,000 cans daily, state John Morrell and Co. Ltd. The company, which has been well known in Liverpool and other leading provincial towns for over 100 years, as manufacturers and distributors of foods, have been canning fruit and vegetables at Bardney, Lincs., for the past 20 years.

Their Dundee factory was opened in the summer to coincide with the start of the soft fruit and pea canning season. For many years Dundee has been renowned for its raspberries, and now strawberries and garden peas are being grown there increasingly.

Covering 20,000 sq. ft. the cannery has been laid out on model lines.

Freshly gathered peas are threshed outside by viners and pass into the cannery proper for processing. After grading and washing, the peas are filled into cans and the lids seamed. The filled cans are loaded into large perforated containers and rolled into pressure cooking retorts. From here they are received into the warehouse section of the building. Labels are affixed and the cans filled into cartons for dispatch.

Soft fruits—the raspberry line runs parallel to the pea canning line—require very careful handling in the initial stages of canning. They are brought to the cannery in "chips" and hand-picked before undergoing processing in the same way as peas.

All raw materials are tested and all processes are controlled in the laboratory, so situated that all canning operations in the factory are clearly visible.

Top: **One of the fresh pea canning lines at the new Dundee cannery.**

Centre: **Canned peas are loaded into one of a battery of pressure cooking retorts.**

Bottom: **The end of the line. Labelling and despatching the canned peas.**

Olympia Retrospect

IMPRESSIONS OF THE 44th INTERNATIONAL BAKERS' AND CONFECTIONERS' EXHIBITION

By Edmund B. Bennion, M.Sc.Tech., F.R.I.C.

THE 1955 Bakers' and Confectioners' Exhibition held at Olympia, London, was a superb show. Never before in this country has there been such a collection of fine examples of the baker's craft and art. Added to these there was a remarkable display of machines and materials. Together, they made Olympia 1955 memorable.

On entering the main hall one was struck by the spacious layout which gave plenty of room to move about and see the exhibits in comfort. The exhibitors made the most of modern display techniques so that all the machines could be seen and examined to their best advantage. In the Empire Hall the colourful displays of the many raw materials and products made from them were most attractive and in the galleries the beautiful craftsmanship displayed in so many forms of work brought superlatives to most tongues. The most experienced and oldest in the trade have never seen better examples of first rate craftsmanship. Also in the gallery there were the craftsmen in the making; students and apprentices competed before the eyes of the trade and public for trophies and shields and rendered a very good account of themselves in doing so, besides showing what fine types of boys and girls are entering the trade to become the craftsmen of tomorrow.

Notable machinery

In breadmaking machinery, the most notable development was in oven design. Most manufacturers have realised the importance of air movement in the oven chambers as a means of ensuring an all over regularity of baking temperature and a quicker means of heat penetration into the goods. It is now claimed by some firms that baking times can be reduced to 26 min. If this can be done tremendous savings in fuel costs will result and output per unit will greatly increase.

Automatic means of depanning have not yet been widely used in this country and progress is only now being made. It seems that there are now two methods available, one evolved by Baker Perkins Ltd. which fits in well with their new Turbo Radiant oven, and that of Vicars set up in conjunction with a Peterson Tunnel oven. Both these units seem efficient but what will prove the most important point in practice is the efficiency with which the loaf is transferred from the pans without damage. The action of the Baker Perkins unit seemed highly satisfactory but in tilting the loaves out the other unit seemed to give rather harsher treatment so that it would seem that with this unit much will depend on the effectiveness with which the loaf is baked and the production of a sound top crust capable of withstanding the first impact as the loaf falls out of the tin. Any weakness in the crumb structure may be accentuated by such treatment. The bread being used had been through this treatment many times so that it was rather the worse for wear. However, provided the fall from the tin can be controlled to prevent damage both to the crumb structure and the crust, here is an all purpose unit which could be used with any type of travelling oven.

The bulk handling of flour from mill to bakery or biscuit factory (which is after all a specialised type of bakery) was displayed in model form by Henry Simon Ltd. Now that more millers are using bulk transport waggons on the road, more bakers may consider putting in installations for bulk handling of flour in the bakery itself. Baker Perkins showed a unit which they are now installing, built on experience gained in Canada, which blends, sieves, and stores flour in bulk for daily handling and conveys it to the very much improved automatic weigher before being used in a high speed mixer. The whole unit is operated by compressed air so that there is neither dust nor waste nor any risk of infestation in the circuit.

Automatic production aids

The automatic bakery is gradually coming nearer to reality. It is possible to operate a modern 9 sack per hr. plant with five men including everything from flour pitching to wrapping after slicing.

In view of the problem of finding labour for bread plants, such new developments are likely to help maintain bread production while making it possible to pay bakers wages comparable with those paid in other industries which are not so tightly controlled through a Government subsidy designed to keep the price of bread as low as possible but which in doing so hits those who produce it very hard indeed.

Although automation is highly advanced in biscuit making for the general run of flour confectionery, processes are not mechanised to the same degree, apart from swiss roll manufacture and pie and tart making.

Designs in cake mixers have not changed very much for many years but modifications are gradually being introduced, all of which contribute to more efficient operators and, in some cases, better yields and greater output.

The streamlining of the outsides of machines and the use of light attractive colours have not only made them better looking but also assists hygiene, since the machines are so much more easily cleaned during and after use.

The increasing demand for chocolate covered products has brought into being a wide range

of special chocolate coverings for use with enrobers under various climatic conditions and in conjunction with different types of bases. A parallel development has been the production of small enrobers by several firms. An enrober for use with fondant has been a real need for many years and this has now been met by the Oddy enrober which is most suitable for medium sized firms. This firm also displayed a machine for slicing genoese into pieces ready for dipping so that with the two machines unlimited quantities of dipped fancies or gateaux can be produced.

Gadgets for doing jobs previously done manually are always being introduced. Machines such as J. Crollie and Son have made for slicing sponges, segmenting the tops, cutting pieces for wrapping, or slicing for creaming, save much time and labour and turn out a good, uniform product without any waste.

Depositors for cake mixing, cream, jam and other fillings are also essential today and there was a wide range on show of sizes suitable for all trades.

The development of prepared cake mixes added interest to a new machine on the stand of the Morton Machine Co. Ltd. Hitherto the mixing of ingredients for this type of product has been done most effectively by the horizontal type of cake mixer, but now a Continental machine is to be produced by Morton which will give an intimate distribution of ingredients without any risk of the fat particles being rubbed into flour granules and greasing them. In other words, the fat, sugar and other ingredients can be dispersed into the flour without any risk of smearing or greasiness and so the final mixture can be handled more easily and, moreover, should have a longer shelf life. The machine is made in two sizes, 66 and 200 gal. One mix can be put through every 5 min. and the approximate weights in each charge would be 50 and 250 lb.

Raw materials

This is the first Bakers' Exhibition since decontrol where all raw materials were exhibited under their branded names. The fat manufacturers have the problem of re-popularising their trade names because a new generation has come into the trade to whom the old names mean little or nothing and who have been brought up on "rationed" fats. Some of these users are less discriminating than their predecessors, while others are discriminating to the point of judging a fat solely on its performance without regard to its brand name. It was not surprising therefore that the fat manufacturers were busy demonstrating the merits of their products and are also busy building up teams of expert demonstrators to go out and show the confectioner what can be achieved with their fats.

Among the suppliers of other products it was noticeable that many firms have extended their range of confectioners' raw materials while the old-established houses once had again a full range of products as in former days.

Continental and British displays

The displays of Continental confectionery and bread in the gallery aroused much interest and set the seal on the standard of the show as a whole. While all the displays were excellent examples of craftsmanship, many thought the Norwegian contribution outstanding.

The display of the Richmont Club likewise attracted much attention and the British Confectioners Association's Golden Jubilee display showed examples of superb craftsmanship in all branches of the trade. When, however, this was compared with the Continental displays, it seemed to lose some of its appeal, not because of any lower standard of craftsmanship but because the Continental's was an entirely different style of craftsmanship—lighter and perhaps more imaginative in its execution and also more colourful, although not gaudy.

Displays by the Institute of British Bakers and the National Federation of Bakery Students were both excellent examples of British bread and confectionery—the latter being particularly well displayed.

In the Open Competitions with all the decorative classes there were some very good entries but those of W. C. Rock were outstanding. Over the years we have seen some great craftsmen of the decorative art but it can safely be said that of all that company Rock leads the way. In the Birthday and Christmas cake classes there were some beautiful cakes, mostly of a high standard.

The standard of entries in the whole range of confectionery was much higher than in 1951, showing how the return of branded fats, better flour and other ingredients has had its effect. In some of the cake classes the judges must have had a difficult job in selecting the winners. Shop display pieces drew a good entry and some interesting pieces were produced, the winning piece being very dainty and well executed.

The bread classes drew good entries and the standard was a good average, in many cases the faults being those of technique rather than fermentation. Many who used white flour had not had sufficient practice or experience with it, while one famous exhibitor complained of the uneven quality of some of the flour; apparently there was lack of uniformity even in one bag.

The speciality and brown bread classes were well supported and some very good bread was on show. Unfortunately, the section of the gallery where the bread was staged was not well lighted, either by daylight or by artificial light, so that it was difficult to appreciate the prize-winning loaves, particularly through a glass window.

The Irish and Scottish sections, as usual, had their own sections where some excellent entries were obtained in all classes. In Ireland, however, flour is still a problem, which probably accounted for the lower standard of some of the bread from Eire.

Lastly, the practical demonstrations and the competitions among students and apprentices aroused much interest.

New Pattern of World Food Production

THE agricultural production of the world, excluding the Communist countries for which figures are still incomplete, was more than 25% greater in 1954 than in 1946-47, reports the Food and Agriculture Organisation in its 1955 report entitled "The State of Food and Agriculture," which reviews agricultural recovery in the ten years since the war. The increase in food production in these areas had slightly outweighed the growth in population since before the war and consequently production per head was slightly above pre-war levels.

Preliminary estimates for 1954-55 from the countries covered in the survey suggest that world food production failed for the first time since the war to show any appreciable increase on the previous years. This was due to less favourable weather in some areas and to acreage reductions in North America.

After very serious reductions in world fisheries production caused by the destruction of fishing boats during the war, production in this field has increased to 20% more than before the war. Most of the increase has occurred in the well-established fisheries of Europe, North America, Japan and the U.S.S.R.

Leaving out the Communist countries, the world is now producing about 20% more rice and milk than before the war, about 30% more wheat, fats and meat, and 50% more fruit and sugar.

The report shows, however, that in many Far Eastern and in some Latin American countries the consumption of food per person still remains below the very inadequate pre-war levels and that generally over large parts of the world the problem is not yet solved of providing people with the means to buy as much food as they need.

The striking aspect of trade in agricultural products has been the change in the pattern. Up to 1952, North American food exports were 3 to 4 times as much as before the war, but then began to decline with the recovery of production in other parts of the world. On the other hand, food exports from the Far East are still less than half the pre-war volume. European food imports, which shortly after the war were unusually high, seem to have settled down at about 10% lower than before the war while North America's food imports show a slow rising trend and Latin American food imports, although they have increased sharply, remain relatively small.

During the last few years of falling farm prices the cost of processing and distributing food in the United States has risen absolutely as well as proportionately, chiefly because of higher labour costs and more elaborate processing. Marketing margins represented 57% of retail food prices in 1954, compared with 47% in 1945. More limited data for several other countries also suggest a recent tendency for marketing costs to rise.

During the post-war shortage price controls, and in some countries food subsidies, limited the rise in retail food prices, though even so they usually increased more than retail prices generally. As supplies became more abundant controls were relaxed and subsidies reduced, and in many countries the paradoxical result was a rise in prices just as supplies became more plentiful. Again, where farm prices have fallen retail prices have often shown little response, mainly because of inflexible marketing costs.

On the question of consumption levels, FAO considers that growth in population and in real per capita incomes might lead to an increase of from 14% to 22% in world food consumption over the next ten years, providing present price relationships remain constant. But food consumption is generally more responsive to changes in price than to changes in income, and more efficient production or distribution, accompanied by reduced retail prices, could substantially increase this estimated rise in consumption.

Trends in Using Fish By-Products

TWO recent trends in the fish by-products industry are (*a*) the introduction of pneumatic (air-lift) driers having relatively low drying temperatures and very short drying times, and with high capacity in relation to size of unit and (*b*) the increasing interest in alternative products to conventional fish meal. These are peptised products in which the protein has been largely converted to water-soluble fragments by acid treatment, or by ensiling the fish with a fermentable carbohydrate (*e.g.* molasses) and a lactic-acid-producing organism. The efficient processing of oily raw material is particularly handicapped by alternating gluts and scarcities of fish, and some methods of storage of raw material are being studied, including preservation by addition of alkali, formaldehyde and sodium nitrite or by preservation of a half-processed commodity such as press-cake. This is stated by J. A. Lovern of Torry Research Station in a review of the by-products industry (*J. Sci. Food Agric.*, 1955, **6**, (5), 233).

The seasonal nature of certain fisheries and the migratory habits of the fish have led to many proposals for floating oil and meal factories. The economics of this are far from simple, but development along these lines is in progress in certain areas. Processing of oily material usually involves the expression of about half the total water along with the oil. In some countries, such as the U.S.A., the aqueous fluid is concentrated and marketed as a special product, "condensed fish solubles," but the present trend in Europe at least is to return the material in some form to the final meal. The introduction of pneumatic driers, with enormously increased amounts of effluent air, has brought with it a new problem if deodorisation is found to be as necessary as with other types of drier.

Paying for New Machines

By D. Compton-James

The current restrictions on hire-purchase and bank overdrafts lend special interest to the question of tax relief on money spent on new machinery and equipment. Here the author explains the tax rebates which can be expected on machinery purchases and gives some hints on making new machines pay for themselves.

ALL manufacturers know that indirectly the Inland Revenue will help them to pay for a new machine, but few of them have any precise conception of the value of such aid. Nor, as a general rule, can dealers in machinery give them any precise information on this point, although it should be an essential item in their sales talk. Relatively speaking, the small- and medium-sized business man will get less help from the Inland Revenue than the big man. This is not Tory favouritism as the Labour extremists would have us believe. It is merely due to the fact that the smaller man pays less tax, and there is less cake for him to cut at.

It is true that over the life of a machine, the Inland Revenue will allow its total cost as a deduction from profits, but if the profits are less than £2,000 a year, the value of the depreciation allowance is at once diminished by two-ninths, or whatever the current earned income fraction may be, because the smaller business man gets that fraction allowed in any case as earned income relief. He then gets the remaining seven-ninths of the depreciation allowance at 8s. 6d. in the £ (possibly less if he is a very small man). So that on an outlay of £1,000 his actual tax saving will be about £320. In other words, the Inland Revenue will pay about one-third of the cost of the new machine. That is the overall picture, spread over the life of the machine, and assuming that the standard rate of tax remains the same.

Tax rebates

Many manufacturers, however, will be more interested in the tax relief they can expect to get in the first year after an outright purchase, or during the currency of a hire-purchase agreement. In the case of an outright purchase, the taxpayer gets an initial allowance of 20%, and an annual allowance at a rate which varies with the particular type of machine. We will assume that it is a light type of machine, electrically driven, for which the official wear-and-tear rate is just over 9%.

In the first year after such outright purchase, the tax rebate will be calculated on £295 (less two-ninths if the owner's profits are less than £2,000) at 8s. 6d. in the £, *i.e.* £98 5s. In succeeding years, the allowance will be just over 9% of the written-down value of the asset. Written-down value is a much misunderstood term. It means that any amount of wear-and-tear allowed is deducted from the value of the asset for the purpose of calculating future allowances. In the second year the written-down value is £705 (£1,000 less the £295 allowed in the first year). The annual allowance in the second year is calculated on the £705 and would amount to £67, the written-down value of the asset then becoming £638. And so on until the value of the asset is virtually extinguished.

Written-down value becomes particularly important if the machine is sold. If its sale price exceeds the written-down value, the excess is chargeable as a profit: if its sale price is less than the written-down value, the deficiency can be claimed as a loss.

If the machine is bought on hire-purchase, the wear-and-tear allowance is calculated on the actual capital outlay in the previous year. Hire-purchase terms vary, but assuming that a 25% deposit is required and that the term of the agreement is two years with 14% added for interest and charges, the deposit would be £250 and the payments about £36 a month. In twelve months therefore the capital outlay would be about £680, and the net tax benefit in the first year after purchase would be about £70.

Increasing output

Obviously the Inland Revenue is not going to be a lot of immediate help in buying a new machine: other factors must therefore be carefully considered. One of these is the increased output and versatility of the new machine as compared with the one already in operation. What has to be considered is whether full or reasonably full paying use can be made of the increased output. This may, and probably will, involve getting more business. In most trades there is a general impression that 20% more business can be found without really looking for it. Indeed, the trade barometer seems to be Set Fair, and likely to remain there for two or three years. That being so, then now is obviously a good time to buy new machinery.

Labour problems may intrude to complicate matters, more specifically labour problems in relation to the internal organisation of the business. On the old machine, an operator may have to put in ten hours' overtime a week to turn out a given quantity of work. The new machine will abolish that overtime, and its savings may well cut into the man's ordinary working hours, thus creating unchargeable time unless new work is found. Sufficient new work may have to be found to provide the operator with ten hours' overtime as before, otherwise he may go to another firm which can give him overtime.

Another factor is the efficient use of the new machine. In small organisations it is often quite difficult to arrange that all machines

are employed with even reasonable efficiency. The purchase of a new machine may therefore involve considerable internal reorganisation. A point to be borne in mind here is that a machine cannot be even reasonably efficient in the hands of an incompetent operator. And, in my opinion, it is even more important for a small- or medium-sized firm to employ only first-class operators than it is for a large firm to do so.

For this reason, small firms should make far greater use than they do of manufacturers' instructional courses. When a new machine is bought, even if it is only a small machine, its proposed operator should be put on a course of instruction with the makers if this is at all possible. Time lost and material wasted by inefficient operators can run into big figures.

A careful study of these points and others that arise in the particular trade concerned may make all the difference between a machine paying for itself, and the owner having to pay for the machine.

The Dairy Show

(*Concluded from page 456*)

Venesta foils are already printed before being delivered to the manufacturer, eliminating the operation of having paper labels attached to the segments of cheese.

New designs for capping strips to operate on synchro-print machines were featured by **Fisher's Foils Ltd.** The synchro-print capping strip is said to cost no more than standard coloured or continuous printed strip and to provide the ideal advertising medium for milk retailers. The company also exhibited butter, margarine and ice-cream wrappers of a laminate of foil, wax vegetable parchment, which can be printed to customer's individual designs.

A visit to Fry's chocolate factory at Somerdale is described in a recent issue of *Cold Logic*, house organ of York Shipley Ltd. The article describes the manufacture and packaging of *Five Boys* chocolate and the part played by their refrigerating equipment in its production.

Advances in Food Technology

FISH LIVER OIL

Conserving Vitamin Content

It has been found that the method of extracting the oil from sturgeon liver has a major influence on the vitamin A content of the oil. The problem has been investigated at the Chemical and Food Research Institute of the City of Hamburg where, after extensive research, improved methods have been devised in order to preserve a greater proportion of the vitamin A contents.—W. Wodsak, *Fette, Seifen, Anstrichmittel*, 1955, **57**, 491.

NUTRITION

Nutritive Value of Heated Vegetable Oils

Data on the nutritive value of heated oils and fats was considered necessary because of the widely differing heating conditions. Previous investigations, in which the oils were usually heated in a current of CO_2 or nitrogen, have shown heated oils to be poorly absorbed, to cause cancerous tumours, paralysis and growth depression.

To elucidate the nutritive value of oils heated in the Indian manner, *i.e.* in open pans for long periods, the residual oil being supplemented with fresh oil and heated again, groundnut, sesame and coconut oils were heated in an open iron pan at 270°C. for 8 hr. They were then incorporated into synthetic diets supplemented with vitamins to give 15% fat and fed to albino rats. Weekly growth records were maintained. After six weeks the liver, spleen, stomach and kidneys of some of the rats were removed and weighed. In every case the heated oil had adversely affected the gain in weight. The liver weights of the heated-oil groups were significantly higher than that of the controls and the livers were also badly damaged.

When the heated oil was fed at 30% level all the rats died within a week, though the controls were quite healthy.—N. V. Raju and R. Rajagopalan, *Nature*, 1955, **176** (4480), 513.

CASHEW NUTS

Retarding Rancidity in Storage

Cashew kernels, being rich in fat, are apt to go rancid with prolonged storage. Experiments with seven vegetable oils showed that roasted and salted kernels could be stored without any deterioration for six months when *Dalda* or refined groundnut oil were used as roasting medium and added at the commencement of roasting.—M. Prasad, *et al.*, *Bull. C.F.T.R.I.*, 1954, **3** (7), 159.

OLIVE OIL

Rapid Check of Oil in Marcs and Cakes

The classical methods for the determination of oil contents by means of soxhlet extraction can only yield results after 24 or 36 hr. because of the need to await drying. The Société Franco-Africaine at Enfidaville, Tunisia, is now using a rapid method which is stated to yield reliable results within 1 hr. The method consists in reflux-boiling the sample with trichlorethylene and determining the difference in the specific weight of the solvent before and after extraction; this difference corresponds to the oil content of the sample. These results are obtained without calculation by means of a diagram. The method is slightly varied for dealing with olive pulps, cakes, sediments and marcs, and can be easily applied by a laboratory assistant without the use of any special or particularly fragile materials.—C. Brès and L. M. Vincent, *Oléagineux*, 1955, **10**, 559).

MEAT

Biological Processes During Cooling

In contrast to slow cooling, where the formation of a dehydrated surface is regarded as an essential preliminary to effective cooling, the permeability of the surface remains undisturbed during rapid cooling so that oxygen can pass freely either way and biological processes are promoted. The oxygen of the cooling air forms reversible compounds with the myoglobin of the muscle cells so that the fresh red flesh colour remains for a long time. Moreover, the acid reaction of the meat juice remains effective so that the meat is well protected against bacterial growth. It is thought that a more profound knowledge of the biological processes in meat may lead to further improvements in the meat cooling and storage technique.—Frühwald, *Die Fleischwirtschaft*, 1955, **7**, 455.

MILK

Cause of Cardboard Flavour

Using chromatographic techniques, a number of compounds was isolated from the steam distillates of skim milk containing oxidised (cardboard) flavour by workers of the Dairy Research Section, Australian C.S.I.R.O. The following compounds were definitely identified: acetone, acetaldehyde, *n*-hexanal, crotonaldehyde, and the C_3 to C_{11} 2-unsaturated aldehydes. Presumptive evidence for the presence of several 2,4-di-unsaturated aldehydes of medium chain length was obtained also. Acetaldehyde and acetone were also isolated from normal skim milk; these two compounds appear to play no part in the defect.

2-Enals, in particular the C_8 and C_9, were considered to be the principal flavour-determining compounds. In milk at dilutions of 1 part in 10^7 to 10^9 they impart an oxidised type of flavour resembling that known as cardboard. Evidence was obtained that 2,4-dienals were also present and they produced a similar flavour.

It may further be deduced that cardboard flavour in milk is caused by the preferential oxidation of di- and polyunsaturated fatty acids.—D. A. Forss, *et al.*, *J. Dairy Research*, 1955, **22** (1), 91-102.

FRUIT JUICES

Production Hygiene

In France the commercial production of fruit juices has made considerable progress. Since fruit juices are excellent nutrients for micro-organisms the strictest observance of hygienic conditions during the processing is essential. Distinctions can be made between three kinds of risks: (1) microbial contamination, countered by ordinary pasteurisation, flash pasteurisation, ultra-pasteurisation, chemical sterilisation or CO_2 treatment; (2) metallic contamination, caused by toxic chemicals (*e.g.* traces of arsenic contained in chemicals used against plant diseases) or by contact with metal apparatus or containers (copper, iron, lead, zinc); and (3) the influence of oxidation, countered by de-aeration. Recent research has confirmed that oxygen has a highly detrimental influence on the vitamin C content of fruit juices.—H. Gachot, *Boissons Douces Légères*, 1955 (28), 17.

FLOUR

Quality After Long Storage

At moisture contents of 13-14% flour in non-gas-tight tins generally became perceptibly rancid after about 5 years' storage at ordinary English temperatures (probably 10°-20°C.); baking quality, however, remained satisfactory up to 10 years in flours below 0·6% in ash content and above 11% in protein content. Mould was found in flours above 14% moisture content.

The contents of gas-tight tins showed a trend towards zero oxygen content as the CO_2 content rose to a limiting value of about 9%. In cases where the oxygen content had fallen below 5% the flour was free from taint after 8 years' storage. Thus in gas-tight tins the storage life may be limited to about 8 years by rancidity developments (the general baking quality remains satisfactory as in the case of non-gas-tight tins) but if the flour is also packed in an inert gas in such tins its storage life will evidently be still further increased.

The fat in the stored flours was generally extensively hydrolysed. The quantity of extractable fat tended often to decrease on storage, the fall being associated with deterioration in baking quality. A *p*H value below 5·2 determined in dough made from stored flour was associated with deterioration in baking quality.—E. N. Greer, *et al.*, *Cer. Chem.*, 1954, **31** (6), 439.

TOMATO PRODUCTS

Rapid Detection of Fruit Fly Eggs

About 10 min. are required to determine the fruit fly egg and/or maggot contamination of tomato products by a new method. The A.O.A.C. procedure takes over 1 hr. A small quantity of tomato juice is mixed with a crystal violet dye. The tomato products absorb the dye readily and are stained dark blue. The fruit fly eggs and maggots are left unstained. The dyed juice is poured over a black glass plate into a collecting vessel and the unstained eggs, which appear pearly white in contrast to the dark blue tomato material and black surface upon which they are viewed, are counted. Since eggs may lodge in the containers used for the count, these are washed and the washings assayed.

Drosophila eggs and maggots are destroyed by homogenisation and samples of homogenised tomato juice containing known numbers of eggs were used to determine the efficiency of the dye method. Results showed that the method gives very good recovery of fruit fly eggs. In comparative tests more eggs were recovered by the dye method than by the official A.O.A.C. method. It is claimed that the speed and efficiency of the dye method make it applicable as a routine quality control technique in the factory.—M. L. Fields, *et al.*, Journal Paper No. 860, Agricultural Experiment Station, Purdue University.

Machinery and Equipment

Dual-purpose fan

Said to be the only fan in the world which simultaneously provides fresh air inlet and foul air extraction from within a room, the new Colt *Two-Way* fan was exhibited at the Building Trades' Exhibition recently. Full-scale working models of the company's complete range of industrial ventilation equipment were built into the stand and operated by visitors. The manufacturers claim that the outstanding feature of their equipment is the ease with which it can be fixed and examples of this fixing in a number of roof and wall constructions were shown.

New laboratory glassware

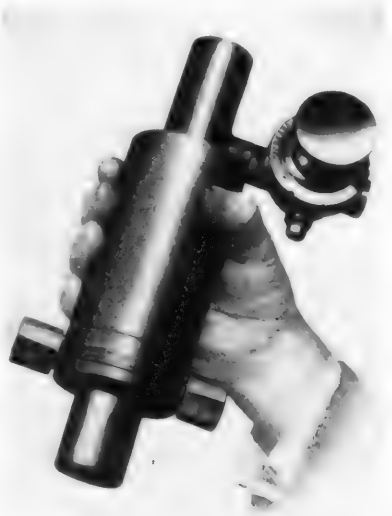
Details of new items in their range of interchangeable laboratory apparatus are given in two supplements to the main Quickfit and Quartz catalogue. In addition, the firm announce a reduction in the prices of their spherical joints.

Supplement No. 1 contains descriptions of some 20 items including large-scale Quickfit apparatus, using B34 joints throughout. Details of four new evaporators, the climbing film, circulatory cyclone, rotary film and jacketed evaporation dish types are given. Additions to semi-micro and analytical apparatus are also included in this supplement.

Supplement No. 2 describes the semi-micro portable laboratory apparatus used for organic preparation and contains a detailed break-down of each assembly into individual components.

Cheaper dust extraction

Savings in capital and running costs are claimed by Dallow Lambert and Co. Ltd. to result from using their pneumatic dust extraction systems. They point out that the pneumatic transport of solids usually entails high expense in systems where the volume of contaminated air that has to be entrained into a plenum system to ensure satisfactory ventilation far exceeds that required for the pneumatic transport of dust. In their extraction systems, where the collected dust has to be conveyed an appreciable distance to the final disposal point, the dust separator is sited as near as possible to the area of extraction and uses an independent pneumatic transport system to carry the dust to the disposal point. The collected dust is fed into the secondary system by means of a venturi throat. Only the minimum amount of air is said to be necessary to prevent dust settling in the ducts and as this is much less than the volume of air originally entrained power and capital costs are saved. The air can be drawn from outside the building and is therefore clean, thus avoiding wear and abrasion on the fan impeller.



A small compressed-air operated hydraulic pump said to be specially suitable for pressure testing valves and small fittings.

The top of the 40ft. high Mitchell-Webster hydrostatic steriliser during the course of construction at the C.W.S. canning plant at Lowestoft.

Pump for pressure testing

A pump only 12 in. long and 3¼ in. dia. is claimed by its makers, Charles S. Madan and Co. Ltd., to give pressures up to 10,000 p.s.i. from a works air line. The pump, which is a junior version of Madan's *Airhydropump*, is made in six models with an overall hydraulic pressure range from 100-10,000 p.s.i. It is operated by compressed air, minimum 20 p.s.i., maximum 100 p.s.i. and is made of non-corrodible materials so that it may be used with either water or oil. There are no metal-to-metal moving parts and maintenance costs are said to be negligible.

The makers claim that the air reducing and control valve enables any required hydraulic pressure in the range of the pump to be produced but not exceeded. Once the pump has been set to give the required pressure no further adjustment is necessary and on a closed circuit it will maintain the pressure exactly for an indefinite period without consuming any air. It is especially recommended for pressure testing of valves and small fittings.

Hydrostatic steriliser improved

Mitchell Engineering Ltd. have introduced the *Hydron*, an entirely new design of hydrostatic steriliser claimed to be capable of considerably greater outputs than standard equipment at present in use in canneries throughout the world.

At the same time features have been incorporated in the heating, sterilising and cooling cycles to give an improved process which is said to result in a much higher quality pack of canned goods of the more delicate type—such as peas or fruit.

The plant is called a " hydrostatic " steriliser because it employs a column of water, the height of which exerts a pressure at its base which is equal to the steam pressure within the steam compartment. By using a head of water in this way it is possible to design a " pressure vessel " having no *mechanical* inlet and outlet valves.

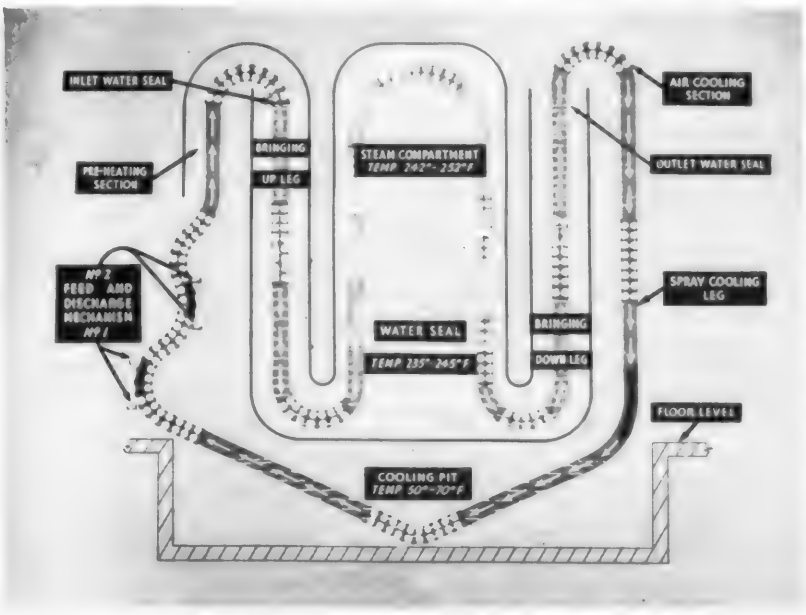
The height of the *Hydron* varies according to the maximum temperature of operation required—for 240° F. it stands approximately 35 ft. high, for 250° F. approximately 45 ft. high and covers a floor area about 15 ft. square. Working on canned garden peas output ranges from 200-600 cans per min. over a wide range of can sizes. Similar but rather smaller machines working at lower temperatures for fruit process-

ing give outputs ranging from 65 to 520 cans per min.

The twin feed and discharge mechanism, perhaps the most important single item of any machine, operates in synchronisation with the vertical movement of the can carriers and is perhaps the least complicated device of its type at present in use in the canning industry. It consists simply of an endless belt running over two large diameter pulleys, the top being the feed level and the bottom (and reverse side) being the discharge level. The moment of feed and discharge is controlled by the can carrier in conjunction with a can interrupter device operated by the main chain.

The can carrier is of the endless type consisting of a series of beams of special section which carry the cans in double rows each row containing about 12-14 cans end to end. These beams, of non-corrosive material, are bolted to twin roller chains operating in a track to convey the cans in a continuous, non-agitating and controlled manner throughout the entire process. With cans 24-28 abreast *per double row* the chain speed through the machine is reduced to approximately 3·5 ft. per min. compared with about 50 ft. per min. in a normal single track machine. This very slow speed obviates the risk of mis-feed and even if this should occur it cannot interrupt the operation of the steriliser or cause a jam.

With delicate products such as peas or soft fruits, agitation and pressure and temperature shocks must be avoided, particularly during the critical sterilising and initial cooling periods. Sudden changes of pressure and temperature during the initial cooling or "bringing down" stage causes boiling within the can and breakage of the product resulting in a cloudy brine or syrup. A principal feature of the hydrostatic system is that the internal and external pressures and temperatures acting on the can are automatically synchronised throughout the whole process thus preventing sudden and damaging changes. A period of air cooling after sterilisation allows the pressure inside the can to fall to a low level when intermittent spray cooling is introduced. By conveying the can with its longitudinal axis in the horizontal plane, as in the Mitchell-Webster system, the tendency to packing or compression of the product in the base of the can is avoided.

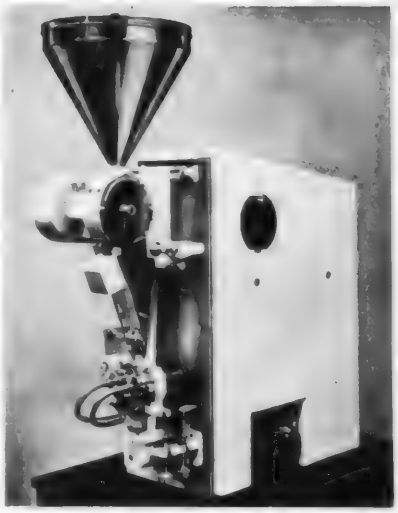


Action of the Mitchell-Webster hydrostatic steriliser

Cans are delivered to the feed mechanism at about 170° F. and enter the pre-heater section where they are heated to about 185° F., before passing to the water seal, the water at this level being at approximately the same temperature. Passing down the bringing-up leg the temperature and pressure progressively increase to the maximum required, i.e. about 240° F. at the water seal. The cans enter the steam compartment without meeting sudden changes in conditions, where they are held for a specified period and pass into the water seal, finally ascending the bringing-down leg to the top of the outlet water seal. A short period of air cooling follows to ensure complete pressure reduction within the can. Intermittent spray cooling continues with a further period in a cooling pit after which the cans are discharged at a temperature of approximately 95°-100° F.

Continuous sachet making and filling

Improved performance and considerably easier operation and maintenance



Speeds of up to 80 per min. are within the capacity of this re-designed sachet making and filling machine, claim the makers, Autopack Ltd.

is claimed by Autopack Ltd. for their re-designed, patented sachet making and filling machine.

A roll of heat sealable paper, film or foil is situated at the top of the machine. This is drawn down by a pair of serrated rollers and in so doing a horizontal seal is made by the roller to form the bottom end of the pocket. While it continues to move downwards a vertical seal closes the side at the same time as the powder is being fed in, after which the top is sealed. The seal forming the top of the pocket also makes the bottom seal on the next pocket so that the feed is continuous. The machine is robustly built and the makers claim that at speeds up to 80 per min. it is running well within its capacity. Provision has been made to bring the heat sealing equipment quickly up to working temperature, at which it is maintained by thermostatic control.

Jet soot blower

A soot blower which is claimed to reduce tube cleaning in smoke tube boilers of the *Economic* and *Vertical* types to a simple 2-3 min. operation on load and which can be fitted quite easily in the smoke-box of most existing boilers has been announced by the Ivor Power Specialty Co. Ltd.

Known as the Ivor traversing jet soot blower, it comprises essentially a header with branch elements and nozzles designed to suit the boiler tube arrangement. This is fed with boiler steam and traversed across the boiler tube plate by a scroll mechanism driven by a simple handwheel or chain-wheel mounted on the side of the smokebox. The high velocity steam jets act directly along the tubes a few at a time thereby giving maximum cleaning effect with no harmful furnace pressure effects.

News Digest

Why not put Cream in Ice Cream?

Tribute to the high quality and relative cheapness of British ice cream was paid by Mr. T. V. N. Fortescue, chief marketing officer of the Milk Marketing Board, at the 5th Annual Conference of the Ice Cream Alliance at Southport. Since a large part of the ice cream market was among children, he congratulated the industry on the way they had kept the price down and thus satisfied their most important clients.

Mr. Fortescue questioned the practice of continuing to call the product "ice cream" since in the vast majority of cases it contained at present no butterfat. He referred to recent legislation on the use of the word "cream" and said that he understood that the Food Standards Committee was at present considering the possibility of restricting the use of the words "ice cream" to descriptions of butterfat products. If this were done he imagined that most manufacturers continuing to call their produce "ice cream" would use imported butter rather than liquid milk, and that such new legislation would thus not appreciably help milk sales in this country.

Would it not be possible, he said, for there to be two distinct products, one on the present lines but not called "ice cream," and the other made with liquid milk or real cream properly called ice cream and selling at a higher price for the restaurant and dining table? His experience had shown, he said, that in present boom conditions the housewife is more than ready to pay for a luxury article, and indeed in many cases was seeking the luxury article rather than the ordinary one. He was convinced that there was a very large market for luxury ice cream, and that the exploitation of this market would not seriously affect the market for the present product.

On the question of rebates for milk used in the manufacture of ice cream, Mr. Fortescue explained that it was the policy of the Milk Marketing Board to grant such rebates only for purposes where an accurate check on the use of the milk supplied could be kept. Ice cream, by its very nature, was a product consumed very soon after manufacture, and its exact composition was very difficult to ascertain after a lapse of time. He suggested that manufacturers who wished to include liquid milk or cream in their product should apply to the Board for a manufacturing licence, which would entitle them to a rebate, indicating that the original provision of the Board's conditions which restricted the issue of such licences to manufacturers using at least 200 gal. of milk a day had been considerably relaxed in cases where the Board was satisfied that a proper check upon the milk used was possible.

Bulk milk handling

The Scottish Milk Marketing Board has issued a report covering the first year of bulk handling and transport of milk. Twenty-three farms in a circuit in Kirkcudbright put this pioneer scheme into use a year ago. Their experience is that the system is both practical and economic. The remaining problems are administrative rather than practical. After reasonable depreciation the cost of equipment works out at little more than that of older equipment; transport costs are perhaps one third less; creamery handling costs are down and will go down very substantially if all producers go over to bulk. The 1,500 gal. tanker is regarded as the best unit for the roads and the loads involved.

To assist the manufacturers concerned the Board has issued a specification for a farm bulk holding tank. However, the Board will not itself approve proffered equipment but will send particulars to the N.I.R.D. at Reading which will become the authorising body for suitability of tanks for this work.

Blackcurrant juice for President Eisenhower

A consignment of blackcurrant juice was flown to President Eisenhower by a large British manufacturer while the President was recovering from his heart attack.

Said a representative of this firm: "President Eisenhower expressed a liking for blackcurrant juice when he had some earlier this year, and he asked for more to be supplied to the White House."

Blackcurrants are not available in the United States in large quantities. Their growth is forbidden in the majority of American states because they harbour an insect which attacks pine forests.

Imports of American raisins

Arrangements have been made for the import of seedless (as distinct from de-seeded) raisins of any type from the U.S.A. As on previous occasions these imports will be paid for from funds made available under the Mutual Security Act.

Licences will be valid for imports until March 31, 1956, and details are given in Notice to Importers No. 751 issued by the Import Licensing Branch of the Board of Trade.

Canned grapefruit imports

Canned grapefruit sections may again be imported from the U.S.A. There is at present a shortage of the fruit in this country and it is expected that these imports will have been distributed before the West Indian supplies begin to arrive.

Announcing the licensing arrangements, which are the same as those made last season, the Board of Trade state that imports will be allowed up to the value of £180,000 f.o.b. Licences will be valid from the date of issue until November 30, 1955. No further licences will be issued before July 1, 1956. The purchases will be financed with funds made available under the U.S. Mutual Security Act.

Importers are expected to be able to buy about 1,600 tons under these arrangements. Pre-war imports from the U.S.A. were about 15,000 to 20,000 tons a year.

Parkinsons' "Productivity team"

Mr. P. H. Bailey and Mr. N. Carter, both directors of Parkinsons Biscuits Ltd., have left for a two months' tour of the U.S. and Canada to examine the latest methods in use for the production of biscuits. They will make a study of the latest design of biscuit factories and plant layout with a view to incorporating these ideas in a new factory in this country.

Cheque marks 50 years' service

To commemorate 50 years' service, Mr. J. R. Cowan, of Craigmillar and British Creameries, Ltd., was recently presented with a framed testimonial and a cheque by the company's vice-chairman, Mr. John Price.

Mr. Cowan, who is 66, has been a senior representative for over 40 years, mainly in the Manchester area.

Far East trip

Mr. Brian N. Reavell, managing director of the Kestner Evaporator and Engineering Co., left London last month for a business visit to the Far East and Australia. Among the places to be visited are Rangoon, Singapore, Hong Kong, Sydney and Melbourne.

Kestner has supplied a variety of chemical plant to the Far East in recent years and it is proposed to extend their activities by the establishment of local agencies in suitable areas.

Food standards committee

The Minister of Agriculture, Fisheries and Food has appointed Mr. M. D. M. Franklin as one of the Joint Secretaries of the Food Standards Committee in place of Mr. F. W. Sidwell.

New seaweed factory

A new seaweed products factory is to be erected at Gairloch in Ross-shire by Powrie Bros. (Seaweed Products) Ltd. The factory will be located at the top of the Gairloch with the seaweed virtually on the doorstep. The firm will be concerned only with the initial processing and will sell to manufacturers.

New self-raising flour plant

Mainly with the object of increasing potential production of *Federation* self-raising flour, a product of the Co-operative Wholesale Society Ltd., new plant has been installed at the Society's Drysaltery Works, Pelaw-on-Tyne.

The new bulk flour storage, mixing and packaging installation by Henry Simon Ltd., Cheadle Heath, is claimed to be the largest and most technically advanced equipment for the mechanical handling of flour in the North East.

From specially designed bulk tankers a flexible hose leads to the plant. An air compressor drives the flour through a filter system into receiving bins with a capacity of 120 tons.

Mixing begins with the extraction of flour from the storage bins. After passing through a centrifugal sifter, flour is blown by compression into giant bins. Immediately below the bins is the weighing system, where the raising ingredients are automatically weighed and mixed with the flour. To render the flour resistant to infestation and ensure a completely homogenous mix, it is passed through a high-speed rotary machine to two automatic packing machines each with a capacity of two tons per hr.

The dangers of pest infestation and climatic deterioration are said to be completely eliminated; and the product is entirely untouched by hand.

Visitors to the new C.W.S. works at Pelaw inspect one of the self-raising flour packing machines. The capacity of this machine is 2 tons per hr. in 3 lb. bags.

New range of emulsifying agents

A versatile group of emulsifying and surface-active agents — the sorbitan fatty acid esters and their derivatives— has been introduced by Howards of Ilford Ltd., under the name *Sorbesters*.

These substances are not novel—they have been available in this country for some time and some of them have been produced in this country—but their special attributes and properties do not appear to have been recognised here to the same extent as abroad. In the U.S.A., for example, they are in regular large-scale use in the food processing, cosmetic, pharmaceutical and other industries.

The sorbitan esters are made by reacting sorbitol (a hexahydric alcohol) with a variety of fatty acids generally derived from natural fats and oils. Under the conditions used, partial dehydration of sorbitol occurs to give the anhydrides known as sorbitans and the final products therefore are largely sorbitan esters rather than simple esters of sorbitol itself. The esters so formed may be modified by reaction with ethylene oxide to give a range of polyoxyethylene sorbitan esters.

All the products in question are surface-active agents and emulsifying agents.

The general uses of the sorbitan esters and their polyoxyethylene derivatives fall into two main categories, namely:

(i) The production of emulsions.

(ii) The utilisation of their surface-active properties for purposes other than emulsion making.

Emulsion technology now spreads into an extremely wide range of industries, but it is believed that the main potential usage of the present products lies in the cosmetic, pharmaceutical, paint, food, cutting oil, polish making and agricultural chemical industries.

In considering their potential use the following special attributes should be borne in mind:

(i) A wide range of individual components with mutual compatibility is available providing a regular gradation of surface-active properties.

(ii) Emulsions prepared with sorbitan ester emulsifying agents are relatively stable in the presence of electrolytes.

(iii) The sorbitan esters are chemically stable and relatively unreactive in the chemical sense.

(iv) The esters are non-corrosive to virtually all materials.

(v) As far as is known, they are non-toxic on ingestion and are innocuous when applied to the skin.

Co-operative biscuit factory

Extensions to their biscuit factory costing £300,000 were inspected by members of the United Co-operative Baking Society at the quarterly meeting recently. The president, Mr. J. Lang, said that the project would increase the society's biscuit production by 50%. This would be absorbed by the increased demand for a greater variety of biscuits, particularly packeted lines. Another reason for the extension, according to Mr. Lang, is that 40% of the biscuit trade in the Scottish Co-operative movement is in the hands of private manufacturers.

Scholarships for student bakers

Scholarships worth from £50-£200 have been awarded to 24 students by the Joint Scholarship Panel of the Baking Industry, representing members of the National Board for Bakery Education and the National Association of Master Bakers. All the scholarships were donated; in most cases by individual companies or by trade associations related to the baking industry.

World's largest chocolate biscuit factory planned

The price of Cadbury's chocolate biscuits have been reduced by up to 2d. a ½ lb. because of increased production at their factory at Moreton, Wirral, Cheshire. The factory, which has been in operation for less than two years and was officially opened last year, has increased the production of chocolate biscuits two and a half times. Cadburys claim that in a year's time it will be the biggest in the world devoted entirely to the manufacture of chocolate biscuits. It employs 1,000 workers who are all local people with the exception of six key men who were brought in from the Bournville factory. Conditions of work are so good that there is a waiting list of would-be employees.

How the British eat

The average British diet in 1953 and the diets of different social classes and types of family in terms of food expenditure, consumption and nutritional value are presented in the fourth annual report of the National Food Survey Committee: "Domestic Food Consumption and Expenditure, 1953" (H.M. Stationery Office, 4s.).

The report shows how the reduction in food supplies in 1951-52 caused by the deterioration in the balance of payments position was decisively reversed in 1953 and how, as a result, the diet tended to revert to a pre-war pattern, with an increased proportion of expenditure devoted to meat, eggs, butter, sugar and tea. A 10% increase in domestic food expenditure in 1953 was almost entirely concentrated on these basic foods, which had all become more plentiful in that year.

The general arrangement of the report is similar to that of the Committee's last report, but new features are included, among them sections on the Scottish diet and on differences between the diets in urban and rural areas. Appendices include a table showing the contribution of different foods to the nutrient content of the diet, while other tables give detailed estimates of expenditure, consumption and average prices paid for over 100 food items.

The 1954 report should be published early next year.

OBITER DICTA

● We must not drop back into easy evenings with port wine and over-ripe pheasant.—*The Chancellor of the Exchequer.*

● I would not rank myself with the gloomy prophets that see world starvation just around the corner.—*Prof. L. Dudley Stamp.*

● I spotted a garlic man awheel in South Kensington with a *lei* of pallid garlic bulbs garlanded over the handlebars of his bicycle. —*Letter to The Times.*

● A New York company has introduced an aluminium branding iron so that foods arrive at the breakfast table emblazoned "Good Morning."—*Aluminium News.*

● Bernard Shaw became a vegetarian not because of compassion for slaughtered animals but because of his deep dislike of burying dead bodies in one that was alive.—*St. John Ervine.*

● The book is admirably free from misprints, though one of them, "The technological future of madkind," was a stroke of genius by the compositor.—*From a review in "Nature" of "Man and Energy."*

● You can almost hear banjos strumming in the background when you eat this one-dish Louisiana meal of pork shoulder steaks cooked in a savoury sauce with rice.—*Recipe issued by American Meat Institute.*

● If market manipulations caused the shortage, then the tea industry should take steps to avoid a repetition. If attributable to some accident of Nature, then the tea industry should see that it does not recur.—*Letter to Daily Telegraph.*

● Mr. James Griffiths, on whom the gift of tongues has descended, is a past master at persuading the audience that breakfast in bed is the equivalent of sojourn in the wilderness on a diet of locusts and wild honey.—*George Schwartz on the Labour Party Conference.*

● La Rosa Spaghetti Co. of New York devised a three-dimensional poster for subway cars. It showed a plate of spaghetti drowned in sauce, and gave off a smell of oregano, tomato paste and garlic which could be smelled 20 ft. away, and was guaranteed to last about 45 days. The Transit Authority declined to exhibit it.—*Drug and Cosmetic Industry.*

F.M.C. price policy

Two price schedules for each given week are now being published by the Fatstock Marketing Corporation for cattle, sheep and pork pigs. As before minimum prices are announced on Friday three days in advance of the beginning of the week to which they apply, but under the new arrangements a second and final schedule is declared seven days later—at the end of the week to which it applies. According to a F.M.C. spokesman the system should ensure that the producer can enjoy the confidence inspired by having an advance indication of his returns and should also receive any additional benefit from factors affecting the market at the time that his stock is actually sent to the Corporation. Bacon pig prices are not affected by this development.

What we owe to advertising

Tribute to the way in which advertising has raised the standards of British home life was paid by Colonel Maurice W. Batchelor at Hastings recently.

"Few people realise," he said, "the great debt the community owes to advertising, and the way in which it is making British homes smarter. Open any newspaper or other publication today, and you see first-class illustrations of brightly decorated homes, of well-cooked meals, of properly laid tables. These standards are rightly coming to be accepted as normal in homes where they would have been undreamt of 30 years ago."

Col. Batchelor, who is chairman of Batchelors Peas Ltd., was speaking at the conference of the Incorporated Society of British Advertisers. He also said that advertising had popularised art, once the prerogative of the so-called upper classes. How many of our famous artists, he asked, would have received such success had it not been for the amounts paid to them by advertisers?

Advertising, too, had "brightened the face of Britain." "Go out into any of our cities, and what do you see? Many of the ugliest places—the drab buildings, the ghostly bomb-sites—have been changed into pleasant garden spaces flanked by bright attractive posters."

Statements that advertising increased costs were due to ignorance of its effect on manufacturing processes. Advertising was the commercial counterpart of medicine and restored weak sales to a healthy standard. It resulted in increased demand which allowed economies to be made in production. Most of the largest advertisers in the country were "the cheapest sellers."

The public, said Col. Batchelor, decided the product or service they wanted. "The lesson we all learnt many years ago is that you cannot sell a dud article twice."

Hanovia exhibition

A comprehensive range of equipment manufactured by Hanovia Lamps was shown at an exhibition the company held in a large exhibition hall of the Midland Electricity Board at Birmingham recently.

The exhibits showed the wide range of applications for ultra-violet rays in industry, medicine and the home.

Chicken sausages

Chicken sausages have been introduced by R. J. Clark, an Edinburgh meat trader, with definite success.

Originally only two hens were used weekly on this trade, but demand has grown to some 30 hens a week, and is still growing. Added value of the sausage sale is that it has also stimulated demand for whole chickens very considerably and created an expanded market for white meat as a whole. Special treatment in the production of the sausages includes removal of the drier chicken fat and replacement with back fat of pork; seasoning is used in the ratio of ½ oz. to 1 lb.

The chicken sausages are sold extensively to restaurants and hotels, which are making a feature of them, as well as to private consumers.

New standard for plastics trays

A new British Standard (B.S. 2581: 1955) covers basic requirements for trays for most normal uses. Trays likely to be subjected to extraordinary conditions, such as very high temperature or exposure to strong alkalis or acids, have been excluded as they can only be made from special materials.

As most types of tray covered by the new standard may be made from either thermosetting or thermoplastic material, the temperature at which the heat resistance test is carried out has been chosen to suit both these types of material. Four types of trays intended for the conveyance, storage or display of a collection of articles are specified as follows:

Type 1. *Catering A*. Trays for cafeteria and hospital food service and conveyance, but excluding trays intended for direct contact with foodstuffs. *Catering B*. Trays for cafeteria and hospital food service and conveyance intended for direct contact with foodstuffs.

Type 2. *Industrial*. Trays for storage and conveyance of goods during and after the process of manufacture.

Type 3. *Food*. Trays intended for direct contact with foodstuffs for display and storage.

Type 4. *Domestic*. Trays for household use, excluding purely decorative use.

Trays for surgical use or purely decorative use are not specified.

The standard gives details of materials, workmanship, fittings and finish as well as providing tests for impact strength and heat resistance. A marking clause is incorporated drawing attention to the B.S. Certification mark, the use of which is optional.

Copies of this Standard are available from the sales branch of the British Standards Institution, 2, Park Street, London, W.1, price 2s. 6d. net.

A water-splash test for the new Commer "Superpoise" 5-ton petrol-engined dropsider. This vehicle has been in continuous development for over two years.

Fish in paper packets

Vacuum-dried fish which are claimed to return to their original weight, bulk and fresh condition, after soaking in cold water, are reported to have been developed by a London firm experimenting in Aberdeen in co-operation with the Ministry of Food experimental factory at Torry. During the process moisture is extracted from the fish which are thus considerably reduced in bulk and weight and can be packed in sealed paper containers. It is claimed that the same process can be applied to meat, vegetables and other foods.

The man responsible for the development is a Norwegian, Mr. Norman Grainger, who has been working on this method for 15 years. The company hopes to secure a site on the southern outskirts of Aberdeen for the erection of a factory for large scale production.

New name for Short and Mason

To identify themselves with their American parent company, Short and Mason Ltd. have changed their name to Taylor-Short and Mason Ltd. For some years the company, which is a subsidiary of Taylor Instrument Companies, U.S.A., has developed the manufacture of two main lines of product: one covering "Short and Mason" scientific and meteorological instruments and the other "Taylor" process control instruments. The two sides of the business are now to be segregated and the name "Taylor" incorporated in the company title to facilitate the handling of correspondence and orders and to improve the world-wide coverage of process control instruments where interchangeability of English and American made components is vital and in connection with which publicity and sales representation are jointly undertaken by the British and American companies. Scientific and meteorological instruments will continue to be sold under the name "Short and Mason."

New trucks for industry

A new range of 2-5 ton trucks has been produced by Commer Cars Ltd. at their recently completed Dunstable factory. The new models available are 2-3 and 3-4 tonners, each with a choice of two wheelbases—10 ft. 2 in. and 13 ft. 1 in. A new 5 tonner is built in wheelbases of 12 ft. for tipper bodywork and 14 ft. 1 in. for dropside and other bodies. There are alternative diesel and petrol power units on the 3-4 tonner and 5 tonner.

A feature of the 2-5 ton models is the new *Full-View* driver's cab, combining strength with comfort. Of heavy gauge it is integrally welded with a substantial underframe and front end. This is attached to the frame through six rubber mountings and is designed for high stresses and strains. The wings are detachable. Provision is made for the fitting of a heater and *Radiomobile* radio kits are available if desired.

Models in the *Superpoise* range are available with various designs of factory-made bodywork—single dropside on the 2-3 tonner, double dropside on the 3-4 tonner and double dropside and all-steel tipper on the 5 tonner.

The standard power unit is a six-cylinder unit developing a gross b.h.p. of 91 and maximum torque of 200 lb. ft. at 1,200 r.p.m. As an alternative to the petrol engine, the 83 b.h.p. P6 diesel engine is available on all models except the 2-3 tonner. On the 5 tonner only, the 104 b.h.p. R6 diesel can also be provided.

APPOINTMENTS AND RETIREMENTS

MR. ROBERT ARMSTRONG, sales manager of Alfred Bird and Sons Ltd., has been appointed general manager of General Foods Inc. for the whole of Australia. He will be in charge of all operations there. Mr. Armstrong was with Standard Brands Ltd. for 25 years, and left to join Alfred Bird's, a General Foods subsidiary, a year ago.

*

DR. A. M. BAXTER, M.SC., has been appointed head of the research department of G. and J. Weir Ltd. with effect from December 1. He is at present the senior lecturer in the department of civil and mechanical engineering, Royal Technical College, Glasgow, and served his apprenticeship at Weirs.

*

MR. G. E. LAWTON, Scottish sales division manager of Batchelors Peas, Ltd., has been appointed a J.P. for Glasgow.

*

MR. GEORGE W. McBAY and MR. JOHN R. M. ASLETT have been appointed directors of George W. Horner and Co. Ltd., confectionery manufacturers. Mr. McBay has served the company as its accountant, and Mr. Aslett is assistant to the managing director, Mr. Kenneth Horner.

*

MR. T. P. BERINGTON has been elected vice-chairman of Monsanto Chemicals Ltd. He joined Monsanto in May, 1929, and was appointed to the board of directors in March, 1930.

*

MR. WILLIAM REID has been elected chairman of the board of Kork-N-Seal Ltd. The following new directors have been appointed:

MR. D. C. BANKS; MR. R. W. FACER; MR. J. O. BRADBROOK, C.A.; MR. A. S. RAILTON. MR. B. MOORHOUSE has been appointed secretary of the company in succession to MR. F. COWARD.

*

MR. J. C. HASLAM has been elected chairman of the publicity committee of the National Federation of Wholesale Grocers. He succeeds MAJOR E. K. EDWARDS, who has withdrawn to devote more time to the chairmanship of the commodities committee.

*

MR. HAROLD J. BROWNLEE has retired from his post as managing director of Quaker Oats Ltd. after 27 years' service. He came to England in 1936 as production manager of Quaker Oats and was appointed a director in 1938 and managing director in 1952. Mr. Brownlee has been succeeded by MR. BASIL C. L. SUMMERS, who has been general manager since 1951.

Mr. Robert Armstrong.

Quaker Oats also announces the appointment of MR. ROLAND T. OUTEN as chairman of the board of directors. In addition, owing to the retirement of Mr. Brownlee, MR. R. D. KENNEDY, secretary of the company since 1940, has been appointed a director.

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Obituary

MR. HENRY CHARLES CRANE, 52, transport manager of J. Lyons and Company Ltd., died on September 28, aged 52. He had been with Lyons for over 30 years.

His duties as head of Lyons fleet of vehicles brought him into close contact with outside transport associations. He was a member of the Worshipful Company of Carmen, the Council of the Mansion House Association on Transport, the Institute of Transport (he retired from the Council in 1952), and the Traders Road Transport Federation. He leaves one daughter.

*

The death occurred on September 24 of MR. G. CAMBITZI, chairman of G. Cambitzi and Co. Ltd., the proprietors of S.F.P. (Food Products) Ltd. and Hanworth Food Products Ltd. Mr. Cambitzi founded his business in 1916 and had been chairman of the limited company since its formation in 1919. He had not been actively engaged in business for several years but maintained a keen interest in its affairs.

*

The death occurred in Sydney on September 12 of MR. REG CAHILL. Mr. Cahill was the owner of Cahill's (Pty.) Ltd., the Australian food manufacturers and canners.

*

MR. GEORGE VERNON TATE, president of Tate and Lyle since April last year, died on September 30. He was 65.

Joining Henry Tate and Sons in 1919, Mr. Tate became a director of Tate and Lyle in 1923 after Henry Tate and Sons acquired the undertakings of Abram Lyle and Sons in 1921. He became vice-chairman of Tate and Lyle and in 1937 he was appointed chairman. He relinquished the chairmanship of the company to become president in 1954.

Erections and Extensions

Glaxo Laboratories, Ltd., will shortly have new extensions built at their factory in Montrose, Scotland.

*

Permission is being sought by **London Central Meat Co., Ltd.,** Charterhouse Street, E.C.1, to erect a new factory on a site near the Red Lion Hotel, Nantwich, Cheshire.

*

Cadbury Bros., Ltd., will shortly enlarge their distribution depot at Blackburn Road, Kilburn, London, N.W.6.

*

Foster Clark, Ltd., are planning the construction of a two-storey extension at their factory premises in Hart Street, Maidstone, Kent.

*

Eburite Corrugated Containers, Ltd., are having new extensions built at their factory in Park Royal Road, London, N.W.10.

*

Eldorado Ice Cream Co., Ltd., plan the construction of a new ice cream distribution depot on a site off Southampton Road, Portsmouth, Hants.

*

Normansell's Cold Stores, Ltd., are planning to build a new warehouse at Beakes Road, Smethwick, Staffs.

*

The building of a new factory for the manufacture of sweets on a site behind Woodfield Street, Morriston, near Swansea, is planned by **F. Holt and Sons, Ltd.,** Orange Street, Swansea.

*

Whitelock's, Ltd., cheese factors, Wellington Street, Stockton-on-Tees, Co. Durham, have had plans prepared for the proposed erection of a new warehouse in Hume Street, Stockton-on-Tees.

*

Preliminary plans have been submitted by **The Nestlé Co., Ltd.,** of Hayes, Middx., to Derbyshire Planning Committee in connection with the proposed erection of a large factory at Mickleover, Derbyshire, for the manufacture of chocolate and confectionery.

*

Lakeland Food Industries, Ltd., are having a 6,000 sq. ft. extension constructed at their factory in Maryport, Cumberland.

*

W. J. Bush and Co., Ltd., of Hackney, are planning to erect extensions to their factory in Batsworth Road, Mitcham, Surrey.

J. Lyons and Co., Ltd., have acquired factory premises in Drayton Road, Tonbridge, Kent, for conversion into a cold storage depot.

*

Severn Valley Meat Products, Ltd., are planning an extension to their premises in Grosvenor Place, Cheltenham, Glos.

*

Fanfold, Ltd., carton makers and printers, 98-106, Cannon Street, London, E.C.4, plan to erect new extensions to their factory in Cricklewood Lane, London, N.W.2, at a cost of £15,000.

*

R. H. Filmer, Ltd., folding box manufacturers, plan to carry out extensions to their factory in Wenlock Road, Holloway, N.7.

*

Scribbans Kemp, Ltd., biscuit manufacturers, of Springfield Road, Belfast, N. Ireland, have acquired a site at Carnmoney, near Belfast, for the construction of a new factory.

*

Erection of a new cheese warehouse in Hume Street, Stockton-on-Tees, is planned by **Whitelocks, Ltd.**

*

Kendies Foods, Ltd., Plympton, Devon, are completing a new 13,000 sq. ft. extension to their factory to increase their present output and to extend to new lines.

*

A new malting plant, said to be the largest and most modern in this country, was opened recently at the Leeds brewery of **Joshua Tetley and Son.**

*

Plans for the construction of a precooling store at Cape Town Harbour, South Africa, are being prepared by the Harbour Engineer. The proposed building will hold 5,000 tons of fruit.

*

Thomas and Evans, Ltd., mineral water manufacturers, have plans in hand for the construction of a new depot on a site at Raikes Lane, Bolton, Lancs.

*

Earnshaw Bros., Ltd., bakers and confectioners, of Sunderland, plan to extend their bakery in Cooper Street, Sunderland.

*

Star Aluminium Co., Ltd., foil manufacturers, Alustar Works, Marston Road, Wolverhampton, are having a new factory constructed on a site at the corner of Stourbridge Road and Old Kidderminster Road, Bridgnorth, Salop.

COMPANY PROFITS AND PROSPECTS

Vaux brew more beer

Higher beer production has raised the net trading profits of Vaux and Associated Breweries Ltd., reported the chairman, Mr. Douglas Nicholson, at the annual meeting recently. A 4% increase in barrelage from 241,710 to 266,523 barrels is responsible for the profits rising from £566,393 to £600,330. The increase in the company's mineral water production has also contributed to the higher profit.

Announcing plans for the future, Mr. Nicholson stated that the company's Sunderland brewery will begin operating its additional bottling plant very soon and it is hoped to complete a new dispatch department by June, 1956, which will simplify handling and speed up deliveries.

*

Bad year for tea company

Only those closely connected with tea distribution know what 1955 has meant to them, stated Mr. Frank Wilson, the chairman of International Tea Company's Stores Ltd., at the recent annual meeting. Referring to the collapse of the tea market he said that the losses that the group has suffered on tea alone more than account for the fall of £54,000 in the trading profit as compared with last year. Fortunately they were able to recover some of the loss by improvements in other departments, though these were also affected by strong competition not only for "bread and butter" lines but for staff.

The group decided to utilise certain of their own lines to meet price cutting and came up against a decreased demand for jams, marmalade and other confectionery. However, improved sales of cakes and biscuits were made.

The group trading profit at £1,701,410 showed a decline on last year of £53,942, though a reduction in income tax resulted in a net profit of £597,270, showing an increase of £33,278 on last year. A final dividend of 10%, making 13¾% for the year, was proposed.

*

U.G.B. to buy Alloa Glass

United Glass Bottle Manufacturers Ltd. have entered into a provisional agreement to acquire the issued share capital of the Alloa Glass Work Co. Ltd. An extraordinary general meeting of the company was convened recently to obtain the approval of Ordinary stockholders to an increase in the company's authorised share capital from its present amount of £3,750,000 to £4,450,000. Part of the purchase money will be provided out of the available cash resources of U.G.B. and the rest by offering 778,444 Ordinary shares of £1 each. Of these 51,977 will be offered to employees of the company for subscription upon favourable terms and the rest will be offered to Ordinary stockholders.

*

Night and day operation raises Heinz's profits

Sales for the year ended April, 1955, exceeded those of the previous year by 28% in volume and 24% in value, announced Mr. H. J. Heinz II at the A.G.M. of the H. J. Heinz Co. Ltd. recently. The increase in tonnage is the highest ever recorded in the company's history. Trading profits for the year increased from £2,017,000 to £3,487,000 and after providing for taxation the surplus for the year is £1,821,000 (£865,000).

The substantial improvement is partly due to the introduction of night and day working at the factories so that facilities have been used to the utmost. This is not regarded as desirable for anything longer than temporary periods because of the strain on men and machines, and substantial additions to facilities and equipment are planned. Referring to the progress of the new factory at Kitt Green (see FOOD MANUFACTURE, October, page 414) Mr. Heinz said that it should be ready for production in 1957 and would probably be in full production a year later. New and existing factories will incorporate continuous and automatic processes which have been developed by research engineers of the company, particularly in the U.S. Some of these processes are already in operation in Heinz factories in the U.S. and Canada.

*

Maconochies turn the corner

Savings in cost by reorganising administration brought Maconochie Foods Ltd. from a loss last year of £80,096 to a trading profit of £96,087 announced the chairman, Mr. R. S. Mays-Smith at their annual meeting recently. After deductions and providing for a loss in the South African company of £45,193 the net profit of the group before taxation was £5,186 compared with a loss in the previous year of £190,008.

The sales of *Pan Yan* pickle increased during the year owing to the improvement of the product, to the provision of a new roll-on metal cap which hermetically seals the container in place of the plastic one, and to an extensive advertising programme which included the production of a colour film.

An improved tomato ketchup was marketed during the year in a new streamlined bottle with a metal cap, while *Kep* sauce has also been packed in a new bottle. Sales of canned fish have also increased owing largely to the easing of import restrictions by New Zealand and to some extent the partial relaxation of Australian import regulations.

Food News Overseas

Radiation survey

A four-volume survey of the use of atomic radiation to sterilise food has been announced by the U.S. Department of Commerce. It deals with the preservation of meat, dairy products, vegetables and other foods by radiation.

One volume in the series is a review of research on meats, proteins, carbohydrates, vitamins and enzymes. It also provides basic material on the subject to food and packaging interests.

Two other volumes contain a detailed bibliography of all material on treatment of food by radiation, while the fourth volume is an index for the third.

Pirates threaten Mexican shrimps

The Mexican shrimp industry is threatened with extinction, according to FOOD MANUFACTURE's correspondent there, because local fishermen are indiscriminately harvesting young shrimps from their hatching beds before they have had time to develop fully. So-called "pirates," operating from the U.S.A. and other foreign ports in well-equipped ships and often using aeroplanes to spot schools of fish, are also blamed for the decline. Last year the total shrimp catch fell to 18,000 tons from the 1953 production of 19,600 tons.

Shrimps spawn on the high seas and the eggs are swept to the coast in what appear to be oil spots or "envelopes." They are hatched on the coast and normally return out to sea where they develop into the giant Mexican white shrimp, the species which brings the highest prices on the U.S. market.

In spite of prohibitions on shrimping activity during the spawning period, the fish are hauled in indiscriminately throughout the year, alleges our correspondent. The practice has been strongly condemned by the National Chamber of the Fishing Industry, the Navy Department and the Mexican National Co-operative Association. However, it continues and threatens to make the species extinct. Foreign shrimp pirates take a heavy share of giant shrimps from Mexican territorial waters (Mexico claims 9 miles of territorial waters) according to a Navy Department official. Official figures show that in 1949 a fleet of 260 craft brought in 10,000 tons of giant white shrimp, while last year the full-strength Mexican fishing fleet of 678 vessels was required to catch the same tonnage, which included a high percentage of inferior red and brown shrimps.

Following the example of the demonstrator, an appreciative Continental crowd samples Charrington's Toby Ale at the recent European Fair, Strasbourg. Nineteen British food and beverage manufacturers were represented at the Cie. Mananga stand shown here.

Geneva conference urges international action on food additives

Recommendations by an international conference on food additives emphasise the potential hazards to health from the indiscriminate use of chemicals to flavour, colour, or preserve foods. The conference was held last month in Geneva under the auspices of the World Health Organisation and the Food and Agriculture Organisation.

The conference, over which Dr. Norman Wright, scientific adviser to the Ministry of Agriculture, Fisheries and Food, presided, urged that international action was necessary because the size of the problem makes it impossible for a single country to undertake the investigation required. More than 800 chemicals have been approved in the U.S.A. as food additives; in Sweden 500 are in use and Germany is said to have more than 1,000.

As a first step the conference recommended uniform methods of evaluating the safety of additives and the drawing up of general principles for their use. Since the introduction of "coal tar" colours more than 2,000 synthetic dyes have been prepared and about 80 are currently permitted in food. There is no internationally agreed list for either natural or synthetic colours, although attempts have been made to obtain acceptance in Europe of seven synthetic and five natural colours.

The conference recommended that priority should be given to the proposed enquiry into preservatives, including antimicrobials and antioxidants which are of special value in limiting wastage and deterioration in the world's available food supplies, particularly in tropical areas.

Dutch investment in Nova Scotia

A Dutch company has bought out the National Sea Products factory at Yarmouth, Nova Scotia, and is planning to build another factory there for the production of livestock feed concentrates. An official of the company said the Yarmouth factory would produce seaweed products and pearl essence. Because of its pig, poultry and cattle business, Nova Scotia appeared to be a logical place for a new feed concentrates factory.

Synthetic glycerine plant for Europe

Work will shortly begin on the construction of the first synthetic glycerine plant in Europe—the only one outside the U.S.A. Costing approximately £2½ million it will be built at the Shell refinery at Pernis, near Rotterdam, in Holland, and is expected to be in operation towards the end of 1957.

Plans are being made by the Shell Chemical Corporation for the construction of another synthetic glycerine plant in the U.S.A.—at Norco, Louisiana

"Better Food" Show for Melbourne

A "Better Food" Exhibition is to be held in Melbourne from January 25 to February 4, 1956.

It will be the second of an annual series organised by a council consisting of representatives of the Food Technology Association of Victoria and the Businessmen's Committee of the Queen Elizabeth Maternal and Child Health Centre. The net profit from the exhibition is to go to the Centre.

Eire to amend preservatives law

The amendment of the Preservatives Regulations will be the first question to be considered by the Food Advisory Committee which has been set up by the Department of Health in the Irish Republic.

The members of the committee are Mr. B. G. Fagan, Dublin City Analyst (chairman); Mr. W. H. Templeton, Messrs. Gateaux Ltd., cake manufacturers, Finglas, Dublin; Mr. W. V. Griffiths, Williams and Woods Ltd., sugar confectionery and jam manufacturers, Dublin; Mr. J. Kearns, State chemist; Dr. J. D. Hourihane, Senior Medical Inspector, Department of Health; Mr. C. Sheehan, Principal Officer of the Department; and Mr. F. E. Dawson, Superintendent Health Inspector.

The committee will consider steps to prevent the inclusion of harmful ingredients in foods and will recommend whether the existing regulations in the Republic will incorporate control of the use of chemical preservatives and colouring agents. It will issue a report in a year's time.

Milk surplus may be frozen

Frozen milk concentrates, said to taste like and to have the same food value as fresh milk, have been perfected by food manufacturers in the U.S.A. According to *Quick Frozen Foods*, a quart of the product can be expanded to three quarts of homogenised full cream milk by adding two quarts of water, and if thawed in the can the concentrate can be poured direct and used as a heavy coffee cream.

Pasteurised milk with a standardised butterfat content is homogenised and condensed under a partial vacuum until two thirds of the water is removed. It is pasteurised a second time and homogenised again at the same 2,000 lb. pressure. It is claimed that the resulting concentrate can be poured into cans of any size, sealed and frozen.

One possible use for the frozen milk concentrates is to help solve the problem of the 600 million gal. of surplus milk in the U.S.A. each year.

The Leonard Hill Technical Group this month

Dairy Engineering.—Preview of the 69th Annual Dairy Show; The Cheeses of Great Britain, 12: Gloucester, Single and Double, and Cotswold; The Manufacture of Milk Chocolate Crumb; Aluminium Churns in the Making.

Manufacturing Chemist.—New Terramycin Plant at Sandwich; Vanillin; The Organic Acid Radical in Therapeutics; Adrenergic Inhibitors, 2: Pharmacology and Therapeutics; Medicinal Products from Tropical Plants; Progress Reports: Antibiotics, Pest Control Chemicals, Perfumery and Essential Oils; Disinfectants.

Corrosion Technology.—Nickel Plating by Direct Chemical Deposition; Corrosion in Singapore; Corrosion Inhibitors in Petroleum Refinery Service.

Fibres.—Synthetic Filling Materials for Brushes; Courlene Polythene Yarn—its Industrial Possibilities; Cellon—the New British Celanese Fibre.

Chemical and Process Engineering.—Ozone, 2: Industrial Applications; Production and Costs in Australia's Sulphuric Acid Industry; Joint Conference on Automatic Control in the Process Industries.

World Crops.—Sulphur Responses in Australasia; Use of Activated Sludge as a Fertiliser; Agricultural Progress in Canada.

Petroleum.—Kwinana Refinery Number: Process Units and Design; Construction and Erection Problems; Layout and Integration of Units and Services; Procurement of Equipment. Review of British Equipment Installed at Kwinana.

Atomics. — Nuclear Reactor Instrumentation; Gas Counting Techniques in Biochemistry, 1.

Paint Manufacture. — The Evaluation of Aluminium Pigments; Making Glowing Colours; Resins from Petroleum; Use Your Plant Efficiently, 2; Problems of Paint Manufacture, 2.

"World's biggest" cold store

What is claimed to be the world's biggest cold storage centre has been inaugurated at Dunkirk. It is 36 yards long, almost as many wide, and 22 yards high, on pillars 8 ft. high. It can hold in storage nearly a thousand tons of perishable foodstuffs, vegetables and carcasses of 650 oxen.

More progress by National Starch

Four-colour advertising is being used for the first time by National Starch Products Inc., of New York. The series has so far featured liquid dextrin adhesive *Aqua-flakes*, polyvinyl acetate-based adhesives and *Soft Seal* adhesive. The advertisement for p.v.a. adhesives deliberately lays stress on the high cost of the product. Headlined "Why higher-priced adhesives save money" the advertisement gives an example of flour bag making in which the adhesive cost was increased 400% by using the company's products. However, as production rose to 250 bags a minute and rejects were eliminated the added glue cost was obviously justified.

Other advertisements feature *Clearjel*, the company's fruit pie stabiliser, refined from waxy maize and claimed to preserve colour, flavour, and clarity. The recipe used by the 1955 Cherry Pie Champion for her prize-winning filling is given.

The company's vinyl polymer products are now being manufactured at a new plant in Meredosia, Illinois, which was opened in August.

Forthcoming Events

Society of Chemical Industry

November 5. "Recent Advances in the Vitamin D Field," by B. Lythgoe, 7.45 p.m., Chemistry Department, Queen's University, Belfast.

November 18. "Some Scientific Aspects of Brewing," by H. J. Bunker, 5 p.m., Washington Singer Laboratories, Exeter.

November 23. "Work of the Brewing Industry Research Foundation," by A. H. Cook, 7.30 p.m., William Newton School, Norton-on-Tees.

Food Group

November 23. Meeting for the Reading of Original Papers, 6.30 p.m., Rooms of the Chemical Society, Burlington House, Piccadilly, London, W.1.

Agriculture Group

November 9. Food and Agriculture Groups' Conversazione at Queen Elizabeth College, Campden Hill Road, London, W.8.

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Incorporated Plant Engineers

November 16. "Refrigeration and its Application," by R. F. Brown, 7 p.m., Bull Hotel, Rochester, Kent.

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Institute of Packaging

November 16. "Glass as a Packaging Medium," by J. L. Turner, 7 p.m., Great Northern Hotel, Leeds, 1.

November 21. "Aluminium Foils and Foil Laminates," by Dr. T. H. Angel, 6.45 p.m., Imperial Hotel, Birmingham.

Trade Marks

APPLICATIONS

FROSTADO.—727,392. Preparations in tablet or powder form made principally of sugar, for use in making frozen confections. **Swizzles, Ltd.,** Carlton House, New Mills, Stockport, Cheshire; Manufacturers and merchants.

FRU-KRIST.—740,117. Preparations in powder form for making fruit flavoured drinks. **Eezee-Freeze Products,** 19, Orchard Road, Havant, Hants; Merchant.

GALA.—732,027. Canned meats. **J. C. Ratner (Produce), Ltd.,** 44, Fish Street Hill, London, E.C.3; Merchants.

GAYELORD HAUSER.—733,025. Skimmed milk and yoghourt preparations, and 733,026. Molasses, yeast (for food), iodised salt (for food), sugar, and wheat germ (for food). **Gayelord Hauser,** 238, East 62nd Street, New York, N.Y., U.S.A.; Merchant. Address for service c/o Wildbore and Gibbons, 101, Leadenhall Street, London, E.C.3.

GIRL GUIDES.—730,316. Non-medicated confectionery and biscuits. **The Girl Guides Association** (a company incorporated by Royal Charter), 17-19, Buckingham Palace Road, London, S.W.1; Merchants.

GLACIER.—739,539. Non-medicated confectionery; tea, coffee, cocoa, and preparations consisting principally of tea, coffee, or of cocoa for use in making beverages. **Fox's Glacier Mints, Ltd.,** 46, Oxford Street, Leicester; Manufacturers and merchants.

GLEMS.—738,948. Glucose sweets (not medicated). **Stotherts, Ltd.,** Albion Works, North Road, Atherton, Manchester; Manufacturers.

GOLDEN BIRD.—B739,260. Condensed milk, cheese, butter and edible fats. **Anglo-Dutch Creameries, Ltd.,** 46, Fish Street Hill, London, E.C.3; Merchants.

GOLDEN BLOOM.—740,278. Non-alcoholic beverages. **Dried Milk Products, Ltd.,** 1, Stoke Road, Guildford, Surrey.

GUZ.—738,068. Vinegar, sauces and spices (other than poultry spice), and 738,067. Meat, fish, meat extracts, preserved fruits, preserved vegetables, soups and pickles. **Jack Houlton,** 291/3, Green Lanes, Finsbury Park, London, N.4; Manufacturers and merchant.

HALO.—732,113. Essences of coffee and chicory. **Walter Pinless,** 21, Scott Park Road, Burnley, Lancs.; Merchant.

HARBACK.—736,026. Flour for export to British West Africa. **Hawley, Russell and Baker, Ltd.,** 20, Blackfriars Lane, London, E.C.4; Merchants.

HELTER-SKELTER.—729,058. Non-medicated confectionery. **Chix Confectionery Co., Ltd.,** 15D, Argyle Avenue, Trading Estate, Slough, Bucks.; Manufacturers and merchants.

HIGH-SPOT.—735,245. Sheep and lamb carcases, rabbit carcases, canned meat, sausage meat, meat offal (for food) and canned fruit. **Norman Smorgon and Sons Pty., Ltd.** (a joint stock company under the laws of Victoria, Australia). Address for service c/o Wildbore and Gibbons, 101, Leadenhall Street, London, E.C.3.

HULA.—B737,947. Canned fruits. **Ambassador Food Co., Ltd.** (a joint stock company under the laws of Jersey, Channel Islands), 2, Library Place, St. Helier, Jersey, Channel Islands; Manufacturers and merchants. Address for service is c/o Gill, Jennings and Every, 51-52, Chancery Lane, London, W.C.2.

INVALACTIC.—733,974. Milk and dairy products (for food), and 733,975. Bread, biscuits, cakes, pastry, puddings, non-medicated confectionery, ice cream powder, beverages, blanc mange and marzipan, all containing milk. **Hind Bros. and Co., Ltd.** (a joint stock company under the laws of the Union of South Africa), The Garden Factory, Umbilo, Natal, South Africa; Manufacturers. Address for service c/o Reginald W. Barker and Co., 61, Cheapside, London, E.C.2.

JUSAROL.—733,434. Pastry. **Thomas Forsyth and Co.,** 44, High Street, Coldstream, Berwickshire; Baker and confectioner.

KINGFISHER.—739,450. Edible oils and edible fats. **Elliott Davies, Ltd.,** 13, Blossom Street, Manchester, 4; Merchants.

KLEEVITE.—738,949. Glucose sweets (non-medicated). **Stotherts, Ltd.,** Albion Works, North Road, Atherton, Manchester; Manufacturers.

KRAFT.—732,187. Margarine. **Kraft Foods, Ltd.,** Silverdale Road, Hayes, Middlesex; Manufacturers and merchants.

LACAYO.—739,526. Sherry wine. **La Montagne (London), Ltd.,** 39, Elystan Street, London, S.W.3; Merchants.

LAVALLEE.—739,731. Wines, spirits (beverages), liqueurs, cocktails and cider. **La Montagne (London), Ltd.,** 39, Elystan Street, London, S.W.3; Merchants.

LITA.—733,351. Milk and milk products. **Nationale Cooperatieve Zuivelverkoopcentrale G.A.** (a co-operative corporation under the laws of the Netherlands), Keizersgracht 472, Amsterdam, Netherlands; Manufacturers and merchants. Address for service, c/o Arthur Sadler and Son, Ocean Chambers, 44, Waterloo Street, Birmingham, 2.

LUN JEELERS.—735,119. Non-medicated boiled sugar sweets containing glucose. **R. Barnett and Co. Ltd.,** 53, Hartley Road, Nottingham; Manufacturing confectioners.

MAMBO.—739,581. Non-medicated chocolate confectionery. **B. O. Murch and Co., Ltd.,** Yatefield Mill, Cog Lane, Burnley, Lancs; Manufacturers.

MENYNORA.—738,861. Butter. **Sundorne Products, Ltd.,** Sundorne House, Featherbed Lane, Shrewsbury; Manufacturers and merchants.

MERACLE.—737,959. Non-alcoholic drinks and preparations for making such drinks. **W. Ryder and Co.,** St. Andrew's Works, Bradford, Yorks; Manufacturer.

MINTOLA.—737,469. Mint-flavoured non-medicated confectionery. **A. J. Caley, Ltd.,** Chapel Field Works, Norwich, Norfolk; Manufacturers and Merchants.

MIRACLAID.—735,655. Preparations in powder form for making fruit drinks. **Eezee-Freeze Products,** 19, Orchard Road, Havant, Hants; Manufacturer.

MR SCOOP.—736,254. Coffee, tea, cocoa, sugar, rice, tapioca, sago, flour cereal breakfast foods, honey, treacle, yeast, baking powder, salt (for food), mustard, vinegar, pepper, sauces, and spices (other than poultry spice). **Scottish Co-operative Wholesale Society, Ltd.,** 95, Morrison Street, Glasgow, C.5; Merchants.

OCCOCRUSH.—738,884. Non-alcoholic drinks and preparations for making such drinks. **Orange-Crush Co. (London), Ltd.,** Ibex House, Minories, London, E.C.2; Manufacturers.

OCEAN DELIGHT.—739,678. Canned fish. **B. N. Sexton and Co., Ltd.,** Plantation House, Eastcheap, London, E.C.3; Merchants.

OCTO.—739,319. Flour. **Eggar, Forrester and Verner, Ltd.,** Plantation House, Fenchurch Street, London, E.C.3; Merchants.

OLD PENDLE.—B736,979. Toffee. **Fergus Taylor, Ltd.,** Park Works, Spring Lane, Colne, Lancs; Manufacturing confectioners.

ONCORE.—739,512. Wines, spirits and liqueurs. **Gallie and Co., Ltd.,** 3, Market Street, St. Helens, Lancs; Merchants.

ONE-UP.—736,881. Non-medicated confectionery. **Barratt and Co., Ltd.,** Mayes Road, Wood Green, London, N.22; Manufacturers and merchants

PALATUM.—B727,340. Soups, brisling, shrimps, crabs and pears, all being canned goods. **George H. Haxforth and Sons, Ltd.,** 22-26, Dryden Chambers, 119, Oxford Street, London, W.1; Manufacturers and merchants.

PAVILION.—730,254. Biscuits (not being chocolate biscuits or animal biscuits). **Wright and Son, Ltd.,** 339-377, The Highway, London, E.1; Manufacturers and merchants.

P.G. TIPS.—731,612. Tea. **Brooke Bond and Co., Ltd.,** Calcutta House, Goulston Street, Aldgate, London, E.1; Manufacturers and merchants.

PLAYBALL.—730,779. Bubble gum. **Chix Confectionery, Ltd.,** 15D, Argyle Street, Trading Estate, Slough, Bucks; Manufacturers and merchants.

POLPAK GREEN LABEL POULTRY.—B738,776. Dead poultry. **Polpak Distributors, Ltd.,** Church Road, Boreham, Essex; Processors and packers.

POMPADOUR.—737,160. Artificial cream (for food). **Vitacream, Ltd.,** 48, Mark Lane, London, E.C.3; Manufacturers and merchants.

PORCOMEL.—737,492. Preparations consisting of dried milk products, lard, vitamins and minerals, being food for sucking pigs. **N.V. Chemische Fabriek "Noord-Holland"** (a limited liability company under the laws of the Netherlands), Pijpkade, 10, Beverwijk, Holland; Manufacturers and merchants. Address for service, c/o Haseltine, Lake and Co., 28, Southampton Buildings, London, W.C.2.

PROSCOMEAL.—737,320. Animal foodstuffs in the form of meal. **Alginate Industries, Ltd.,** Walter House, Bedford Street, Strand, London, W.C.2; Manufacturers.

RED DEVON.—731,621. Butter for sale in London, Middlesex, Hertford, Norfolk, Suffolk, Essex, Kent, Surrey, Sussex, Dorset, Somerset, Devon, Cornwall, Gloucester, Oxford, Buckingham, Bedford, Cambridge, Northampton, Berkshire, Hampshire and Wiltshire. **Sorensen and Co., Ltd.,** 49, Tooley Street, London, S.E.1; Merchants.

RELSKY.—732,770. Wines, spirits and liqueurs. **Leon Relecom,** 17, Avenue Marnix, Brussels, Belgium; Merchant. Address for service, c/o Mewburn Ellis and Co., 70/72, Chancery Lane, London, W.C.2.

TRIO.—739,639. Non-alcoholic drinks and preparations for making such drinks and fruit juices. **Optrox, Ltd.,** 17, Wadsworth Road, Perivale, Middlesex; Manufacturers.

Food Packaging

Impregnated with protective substances that make them suitable for foodstuffs and other materials, these wooden drums are said to be completely watertight.

Pressure tapes for productivity

A complete range of pressure-sensitive tapes was displayed at the recent Productivity Exhibition in Liverpool by John Gosheron and Co. Ltd., including tapes manufactured in film, cloth and paper materials. Demonstrations on the stand showed how self-adhesive tapes aid productivity by helping to reduce labour costs and time. Printed tapes on display varied from one to four colours for use on production work for instruction labels, warning devices, colour coding for batch production and point of sale advertising. Special surface tapes, which can be written on with fountain pens, ball pens or simply with an ordinary sharp metal point, were also shown.

The company also demonstrated a series of industrial and office tape dispensers.

Cakes in visible packs

Suggestions for wrapping cakes and other flour confectionery, information on different packs, and details of packaging machines and their suppliers are given in a new handbook published by British Cellophane Ltd.: "The Visible Packaging of Flour Confectionery."

After giving details of the three grades of *Cellophane* suitable for wrapping flour confectionery, the booklet makes detailed suggestions for wrapping pound cakes, sponge sandwiches, Christmas and other iced cakes, small cakes and swiss rolls, including illustrations of direct wraps, open-top cartons and packs based on cardboard. Also mentioned are sealing irons and hot plates, the B.C.L. wrapping aid and semi- and fully automatic machinery.

New soup labels

New labels for their canned soups which will gradually supersede existing designs are being introduced by Batchelors Peas, Ltd. The firm is also issuing a new multiple-price ticket in cut-out sheets from which the individual prices can easily be pressed.

The new labels, attractively designed in red and white, are uniform throughout for all Batchelors' canned soup lines, only the name of the soup, which appears in white lettering in a black panel, altering. The price tickets are printed in black on a yellow background.

Watertight wooden drums

Waterproof impregnated plywood drums, said to be suitable for such foods as pickled vegetables and to have a life of about 30 trips, are being made in Germany by Fassfabrik Hessenthal and are obtainable in this country through Peter Brent and Co. Ltd. The drums are impregnated with various agents, the bases of which are usually polyvinyl chloride, latex or silicones. However, cheaper impregnants are available, including water glass, paraffin wax and variations of the latter. These are said to be tough and to be suitable for foods and emulsions. A special tasteless and odourless p.v.c. based impregnant is also available for foodstuffs.

The drums themselves are made of three layers of three-ply wood the body thus being formed of one sheet nine plies deep. Each veneer is laminated so that the direction of the grain is constantly varied and the makers claim that this construction prevents the drum from swelling in contact with moisture or shrinking in a hot, dry atmosphere.

The drums are available in nine sizes from 5-200 kg. Prices vary, depending largely on the quantity ordered, but an approximate price for a 50 kg. drum—probably the most popular size—would be about £2 15s. including freight and duty.

Bulk packed butter

Irish creameries may now pack butter in bulk to help keep down their costs under an order announced recently by the Minister of Agriculture in Ireland, under the Dairy Produce Act, 1924. The butter will be packed in 56 lb. fibreboard containers. Existing packages may still be used.

Revised markings for all packages, vegetable parchment paper and cartons used for wrapping butter are prescribed under the Order.

New pack for pressed pork

Packs of pressed pork, weighing 8 to 10 lb., have been introduced by T. Wall and Sons (Meat Products), Ltd., in a new wrapping of *Visking* transparent cellulose, which enhances the pork's display appeal and at the same time protects it completely.

The wrapping permits the pork to be packed so that it is completely visible, while the attractive design of red and white lettering immediately establishes brand identification.

The cellulose is applied after soaking in water and shrinks on to the pork, giving it a smooth, glazed appearance.

The red and white lettering on these cellulose - wrapped packs of pressed pork immediately identifies the brand as Walls. The product is completely visible.

New Companies

Montrose Canned Foods, Ltd. (554627.) £100. Subs.: K. H. Port, 17, Bankhurst Road, London, S.E.6, and P. Anthony.

Reynolds Wholesale Meat Supply, Ltd. (554640.) Trelawney House, Marazion, Cornwall. £100. Dirs.: T. Reynolds, H. Reynolds and S. Reynolds.

Sculthorpe (Slaughterers), Ltd. (554646.) 85, Highfield Road, Wellingborough, Northants. £2,000. Dirs.: W. J., Ethel, S. and W. J. Redden.

Shirley Confectionery, Ltd. (554647.) 2, Bridle Parade, Shirley, Surrey. £100. Dirs.: J. S. and S. A. Reeves.

Tring Meat Supplies, Ltd. (554659.) 18, St. George Street, Hanover Square, London, W.1. Slaughterhouse proprietors, etc. £1,000. Dirs.: S. Aarons and B. Carne.

Bacon Information Council, Ltd. (554858.) Committee: F. L. Hirts, 55, Southway, Carshalton Beeches, Surrey, E. E. Marsh, T. Shaw, H. V. Bang and E. Roll.

Anthony's (Leicester), Ltd. (554728.) 41, Guildhall Lane, Leicester. Bakers and confectioners. £5,000. Dir.: V. A. Smith.

Cecil and Shaw, Ltd. (554731.) 38, King William Street, London, E.C.4. To plant, grow, import, manufacture, blend and deal in tea, coffee and cocoa, etc. £5,000. Dirs.: C. C. and Mrs. F. S. King.

Simmons (East Ham), Ltd. (554755.) 216, High Street North, East Ham, London, E.6. Bakers and confectioners. £1,000. Dirs.: K. Mullett and W. M. Hennessey.

Mario Galea (London) and Co., Ltd. (551242.) 15, James Street, Covent Garden, London, W.C.2. Importers of fruit and vegetables, etc. £100. Dirs.: M. and Mrs. A. M. Galea.

Iberian Importers, Ltd. (551279.) 3, Dyers Buildings, Holborn, London, E.C.1. Bottlers, canners, packers, general merchants, dealers, distributors and agents for the sale of fruit juices, concentrates and syrups, fruit, vegetables, meat, poultry, etc. £100. Subs.: D. Israel and N. E. Picking.

Nether Stowey Meat Supply, Ltd. (551286.) 5, King Square, Bridgwater, Somerset. £5,000. Dirs.: R. J. Biddlecombe, C. Legg and H. A. Salvidge.

Nichols Bakeries, Ltd. (551307.) Bell Street, Witchurch, Southampton. £4,000. Dirs.: S. F. A. West and F. S. Dickerson.

Blackburn Confectionery Co., Ltd. (551313.) 33, Clayton Street, Blackburn, Lancs. To take over business of a wholesale confectionery carried on at Blackburn as "Blackburn Confectionery Co." by John R. Higham. £2,000. Dirs.: J. R. and Mrs. S. Higham, H. Higham.

Humphreys Dairies, Ltd. (551403.) The Haven, Trenwith Lane, St. Ives, Cornwall, £7,500. Dirs.: R. T. and Mrs. E. P. Humphreys.

J. Newman (Blyth), Ltd. (546843.) Central Buildings, Waterloo Road, Blyth, Northumberland. To take over business of bakers and confectioners carried on as "J. Newman" at Blyth. £5,000. Dirs.: J. N. and Mildred Marshall, D. Marshall.

Guz Foods, Ltd. (546944.) 291-3, Green Lanes, London, N.4. Importers, exporters, mfrs. of and dealers in foods and food products. £100. Dir.: J. Houlton.

Commercial Wrapping, Ltd. (548456.) 44, Prospect Road, Farnborough, Hants. £200. Dirs.: D. Kay and Mrs. S. Kay, G. Rothwell and Mrs. A. Rothwell.

Avenue Hygienic Dairies, Ltd. (548526.) 23, Wakefield Street, East Ham, London, E.6. To take over businesses of dairymen and provision merchants carried on at 23, Wakefield Street, London, E.6, by Norman B. Cork, and at 76, Plashet Grove, London, E.6, by Mrs. D. E. Jenkins. £1,000. D. E. Jenkins and J. H. Jenkins.

Phythians, Ltd. (548573.) 31, Liverpool Road, St. Helens, Lancs. Manufacturers of and dealers in meat pies, pasties and all other associated goods, butchers, etc. £10,000. Dirs.: C. Phythian, W. G. Holden, J. Killshaw, C. A. Hunter and S. Hall.

R. E. Broxton, Ltd. (548575.) 35, Victoria Street, Liverpool, 2. Fresh fruit and vegetable importers and exporters, etc. £1,000. Dirs.: R. E. and Mrs. E. M. Broxton.

Cherryfield Food Products, Ltd. (548944.) 44, Cherry Orchard Road, Croydon, Surrey. £500. Dirs.: T. P. and J. P. Coughlan.

Surrey Bacon Co., Ltd. (546521.) 93, High Street, Epsom, Surrey. £10,000. Dirs.: R. A. Samwell and G. J. Shewry.

W. F. Charters (Tettenhall), Ltd. (547841.) Fruit, fish and poultry mchts., etc. £4,500. Dirs.: A. and C. Kenwrick, 36, Antrobus Road, Sutton Coldfield, Warwicks.

Woodside Meats, Ltd. (554580.) Importers and exporters of meat. £100. Subs.: C. G. Stickler, C. J. Pollard, 11, Old Jewry, London, E.C.2.

Fuller and Hall, Ltd. (554538.) Exporters and importers of fresh fruit and vegetables. £100. Subs.: Jean and T. A. Herbert, 156, Strand, London, W.C.2.

Flour Advisory Bureau, Ltd. (554604.) To improve the organisation of the flour milling industry in England, Wales and elsewhere. £100. Dirs.: J. A. Rank, Sutton Manor, Sutton Scotney, Winchester, W. D. Vernon, D. B. King and W. M. Impey.

George Harris and Son (Whisky Brokers), Ltd. (554608.) £5,000. Dirs.: Mrs. R. M. Harris, Wingstone, Maraton, Newton Abbot, Devon, and R. A. Peacock.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.

COMPANY MEETING

SCRIBBANS-KEMP

The 28th annual general meeting of Scribbans-Kemp Limited was held on September 27 in London, Mr. H. Oliver-King (chairman and managing director) presiding.

The following is an extract from his circulated statement:

The year to 31st March, 1955, was mostly one of consolidation with some success in the reorganisation of the Companies' factories and the establishment of depots for the distribution of the Companies' products. The new selling and distributive organisation is growing apace and is proving effective in handling the Companies' products.

The Scottish factory, though still not completed, is back in full production and showing very profitable results. One of the more serious limiting factors during the year has been the great difficulty in obtaining suitable labour in the London area. This has pinned down our production in London and in turn both expansion and turnover. So intractable a problem has this proved that steps had to be taken to expand the Grimsby organisation to a considerable extent and a large building scheme is on its way as an addition to our Lincolnshire interests.

Cake sales in general were very difficult for the first three months of the year. However, new methods have been adopted and newer techniques employed and there has been an improvement in this branch of our activities.

The reorganisation of the Barker and Dobson factories is proceeding according to plan and it is hoped to have both the new offices and the new sugar confectionery factory in operation before Christmas. Both turnover and profit have been maintained.

The retail side of our interests has had a fair year. The policy of the Company to modernise the whole of the branches is proceeding and some of the newer branches are showing most satisfactory returns.

It has been necessary to invest a further considerable sum of money in Canada. This was required for a large extension to our Hochelaga interests in Montreal. The investment to date is showing excellent results. In Johannesburg we were unfortunate in making a small loss, but this was compensated to some extent by Cape Town which is operating at a satisfactory profit.

The trading profit is £1,304,974, which is slightly more than last year and achieved after writing off £30,000 for modernisation. Taxation this year took £663,861 as against £783,191 leaving us with a net figure for the Group of £704,243 as against £657,930.

In the Balance Sheet Fixed Assets have risen from £3,593,238 to £4,103,481. The Current Assets exceed Current Liabilities by £2,653,248 which is satisfactory.

Such figures as have been presented to me for the current year show that results are being quite well maintained except in one division. The board has every confidence that when its plans come to fruition, shareholders will not be disappointed.

The report was adopted and a total dividend distribution of 12½% was approved.

Information and Advice

This Service is available to subscribers to Food Manufacture. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Thickening tomato soup

B.7627. *We should like information on the thickening of tomato soup.* (Groningen, Netherlands)

Soups are usually thickened by adding starch, flour, or a gum soaked in water or vinegar. Starch gives a better result than flour, and acts as a stabilising agent as well. The thickening properties of these materials are adversely affected by boiling, and they are therefore added at the end of the boiling period. Starch must be completely wetted by the water or vinegar in which it is soaked and any lumps broken up before it is added to the gum. If a gum is used, it is advisable to soak it thoroughly in water in the form of a fairly finely-ground flour.

American type cake mix

B.7595. *We wish to make and pack an American type white cake mix using high ratio flour and hydrogenated fat. Would you please give us a basic recipe for such a mix?* (Brisbane, Australia)

WHITE CAKE MIX

	lb.	*oz.*
Special cake flour	10	0
Special hydrogenated shortening	5	0
Castor sugar	12	0
Baking powder		9
Milk powder	1	0
Salt		2
Cream powder		1½
Dried albumen or substitute		10

Total liquor required, 13 lb.; 1 lb. of dry mix will take 7 oz. of water.

Mix in a Universal type mixer (horizontal) incorporating the fat and flour first and sieving in the other ingredients once the fat is truly dispersed. The machine is kept working slowly all the time.

Manufacture of chocolate-coated nuts

B.7616. *We are experimenting with chocolate-coated nuts in a small gas-heated revolving pan, 24-in. dia. Using 30° Baumé syrup (at 68°), flavoured and coloured, we find that however small the degree of wetting, the nuts stick together immediately and also to the sides of the pan. How can this be overcome? What should be the temperature of the syrup on application, at what temperature should the pan be kept, and how fast should it revolve? When should dustings be applied and should they be of sugar, flour or cocoa powder? We are trying only very small lots of about 1 lb. nuts each time. Would there be any appreciable difference if we were to use large quantities? Before beginning to coat the nuts with chocolate syrup we have thoroughly covered them with a solution of gum arabic—1 lb. gum to 1 pint of water.* (Sheffield)

The sticking of the nuts would be appreciably lessened by sheer weight of mass if larger quantities were processed. The syrup is applied at room temperature and the pan should revolve at 18-20 r.p.m.

The gum coating must be thoroughly dry before applying charges of syrup. The dusting should be made immediately the nuts are completely covered with the syrup charge, the operator passing his hand through the nuts as they revolve to assist freedom of movement. Once the first dusting has been made the pieces will begin to revolve more freely but the operator must assist the operation with his hand throughout the whole coating process. The dusting may be done with mixtures of icing sugar and cocoa powder in the proportion required. Each charge must be allowed to dry thoroughly before a further charge is added. The syrup charges and dustings are continued till the desired size of confection is achieved. The final charges should be made in an unheated pan and finished when perfectly dry, by placing a slab or several pieces of beeswax in the pan and allowing to run until polished.

Information supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery and materials, and also general information as follows:

B.7600. *Supplier of food colours.* (Paris)

B.7601. *Information on manufacture of apple juice.* (London, W.12)

B.7602. *Advice on the prevention of fat concentrations in the can during canning.* (Tel Aviv)

B.7603. *Information on canning meal preparations* (Somalia)

B.7604. *Advice on installation of ventilation in bakery storeroom.* (Inverness)

B.7607. *Makers of canning and boiling machines.* (London, E.C.1)

B.7608. *Names of firms making phosphates.* (Co. Kildare)

B.7609. *Recipe for cheese straws.* (Patrington, Yorks.)

B.7610. *Information on canning creamed rice.* (Spalding, Lincs.)

B.7611. *Advice on manufacture of potato puffs.* (Blackburn, Lancs.)

B.7612. *Recipe for wafer biscuits.* (Nicosia, Cyprus)

B.7613. *Books on food preservation.* (Sheffield)

B.7614. *Suppliers of automatic packing machines for ground coffee.* (Gloucester)

B.7615. *Advice on filling jam into large tins.* (Slough, Bucks.)

B.7616. *Advice on manufacture of chocolate coated nuts.* (Sheffield)

B.7617. *Procedure for manufacture of pork and veal luncheon meat.* (London, E.15)

B.7619. *Suppliers of packaging machinery.* (Eslov, Sweden)

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

730,533. W. V. Dawkings and D. Dawkings: Mechanisms for sieving or mashing foodstuffs.

736,171. J. M. Campbell: Machines for cutting off the fins of fish.

736,565. Canadian Breweries, Ltd.: Process for clarifying and stabilising vegetable beverages containing tannin.

735,530. Process Millers, Inc.: Method of milling whole grain kernels for producing a non-rancidifying product.

735,461. Gaskell and Chambers, Ltd.: Valves for beer or other barrels, casks or similar receptacles.

735,734. H. F. R. Knollenberg: Method and apparatus for manufacturing fats.

735,480. W. S. Barron and Son, Ltd.: Machine for the drying treatment of cereal flakes.

735,608. C. Zeuthen: Method of manufacturing butter, and butter worker for utilising the method.

735,857. V. Perina: Apparatus for heating an oven chamber of a baking or cooking oven.

736,013. Samband Islenzkra Samvinnufelaga and K. Bjornsson: Fish skinning machines.

739,702. G. H. R. Watson: Production of bakers' yeast.

739,486. R. W. Webster and Co., Ltd.: Apparatus for crating and decrating bottles.

739,916. Verkstads A. B. Mekano.: Devices for conveying of bottles.

739,619. R. G. T. Baader: Apparatus for skinning fish fillets.

739,624. G. Wagner: Sealing rings for preserving cans.

739,534. G. Diefenbach: Continuous presses for oleiferous seeds and other fruits.

739,867. Gutt Hoffnungshutte Sterkrade A.G.: Roll housings for sugar cane mills.

739,982. F. Knops, J. Thouet and R. Knops: Rotary grinding machine for chocolate and similar masses.

739,991. N. J. and E. I. Williams: Means for use in the handling and grading of fruit.

739,792. Soc. d'Etude et d'Exploitation Chimie et Mecanique E.C.E.M.: Peeling machines.

739,899. Kraft Foods Co.: Divisible package.

736,979. Martin and Martin, Ltd.: Machines for packing articles in bottles or jars.

ABSTRACTS OF BRITISH PATENTS

Chocolate straining improved

Straining chocolate is difficult because of the changing physical structure of the mass. The consistency varies from that of an oil to that of a dough just before the chocolate is moulded. Molten chocolate must approach its setting temperature, and this results in an increase of viscosity so that under the influence of gravity it will only pass through a fairly large-meshed strainer. Gravity-operated strainers are not suitable for molten chocolate mass which passes through the strainer in thin streams, forming air bubbles which cannot be eliminated later. Horizontally arranged strainers soon become clogged by foreign matter.

In this invention, a viscous mass of unstrained molten chocolate is pumped through a pipe into a straining chamber. The chamber is equipped with a circular wire mesh strainer which can be easily removed for cleaning. Foreign matter and sediment fall into a trap in front of the strainer and are removed by a worm conveyor. The worm conveyor actuates a scraper bar which keeps the strainer from becoming clogged.—731,488. *Baker Perkins.*

Continuous baking pans

An improved baking pan for use in continuous baking machines is adapted to be continuously fed or ejected and replaced by similar pans.

The pan consists of a top portion, containing a number of cavities to hold the batter, with flanges that terminate in right-angled saddle portions adapted to ride on the conveyor system. The invention includes a device for conveying and inverting the pans by gears which engage with the lobe portions of the end members of the pans.—730,810. *G. Reget.*

Improved milk cooling

Tnis invention relates to "in-can" coolers by which milk can be cooled in the can or churn. These coolers consist of a head or top casing which fits over the open top of the can, and from which is rotatably suspended a hollow central spindle which is connected to the cooling water supply. At its lower end the spindle branches into two upwardly extending limbs, whose upper ends terminate above a disc fast on the spindle and are each provided with tangential outlets and through which the water discharges. The whole assembly constitutes a rotor immersed in the milk.

The reaction produced by the discharge of water from the outflow pipes causes the rotor to turn slowly in the milk, the water discharge setting up a further cooling action on the outside of the can. For this purpose the head of the cooler is formed with an inwardly extending flange in which the discharged water collects and is evenly distributed through a series of apertures.

In present designs the central spindle of the rotor is supported by a thrust bearing in a collar forming part of the head. The bearing is at a point above the intake of the cooling water to the spindle so that damage from water will be prevented. With this arrangement it is necessary to arrange the nozzle providing the water intake to the spindle at right angles to the axis.

In the present invention the central spindle of the rotor is suspended from a bearing located in a plane beneath the inlet for the water, which takes place through a central opening provided by the bore of the pipe forming or connected to the rotor spindle, so that the bearing is subjected to the lubricating action of the water as it passes into the pipe.

The bearing can be provided by a two part collar consisting of an upper portion, flanged for attaching to the head and formed with a nozzle for connection to the water supply, and a lower portion in which there is an annular shoulder providing a recess for the ball race.

On the upper end of the spindle there is a flange formed to fit the recess, its under side being supported with the ball bearings. On the underside of the flange of the upper portion of the collar is a recess which is screwed internally and into which the lower portion is detachably secured, the shoulder being screw threaded for this purpose

It is said that by means of this invention it is possible to obtain an unobstructed flow of water to the rotor and the attachment nozzle for the water supply hose can be arranged in axial alignment instead of at right angles.—728,617. *J. J. Blow, Ltd.*

ABSTRACTS OF FOREIGN PATENTS

Dehydration of cooked potatoes

Approximately 60% of the water in cooked mashed potatoes is removed by adding 0·5-1·0 ethylene hydroxide to 1 part of potato, placing the slurry in a container made of regenerated cellulose with a wall thickness of 1-2 mils. and exposing the container to a current of air to allow diffusion and evaporation. The slurry is then filtered so that an additional 25-30% water is removed. The filter cake is dried to give a granular powder, which can be rehydrated to produce a mashed potato with the characteristics of freshly made mashed potato.—U.S. 2,704,260. (Through *Chemical Abst.*)

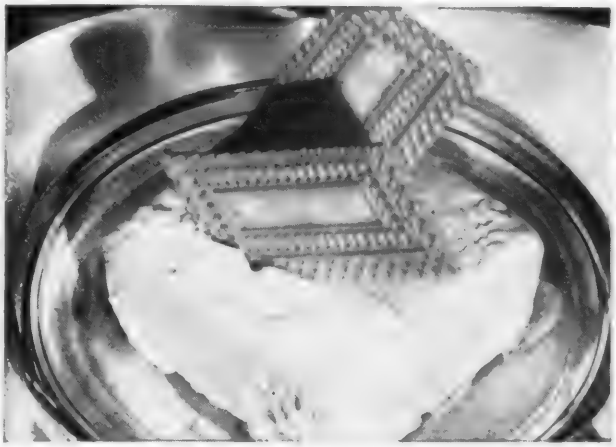
Shaped containers for cream

Flexible containers for oil-in-water emulsions including milk or cream can be shaped from a solution of 0·8-3% by weight of an organic polysilicone in a vinyl-type resin. A suggested formula is 91% polystyrene, 1·4% organic polysilicone and 7·9% chlorinated paraffin.—Dutch 73,234. (Through *Chem. Abst.*)

Food wrapping material

Sausages, eggs, or other foods can be preserved by coating them with a thin layer of vulcanised rubber latex, prepared by heating non-concentrated latex with sulphur, zinc oxide and an accelerator at 80° for 1 hr. The coated products can be vulcanised afterwards for a short time. For products packed in paper boxes the boxes are coated in the same way. The wrapping layer is transparent and impermeable to air and water.—Dutch 74,913.

Loders Cocos Butters



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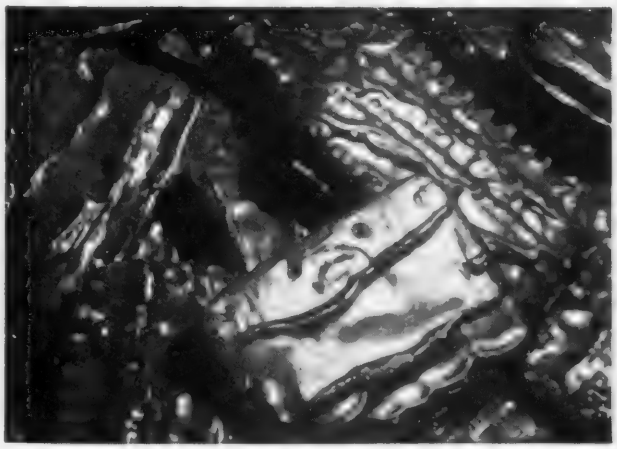

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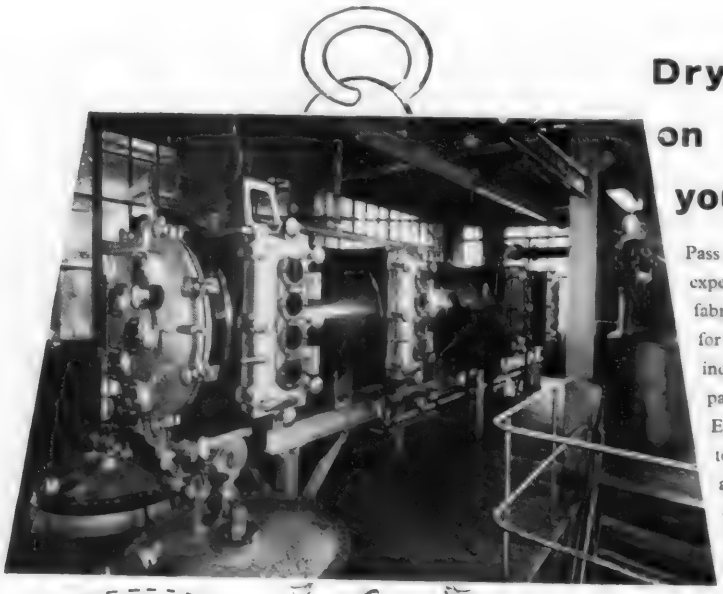

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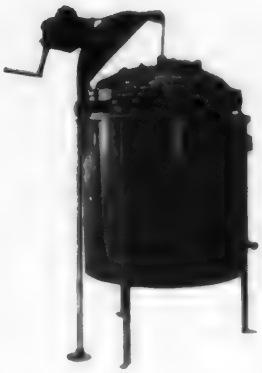

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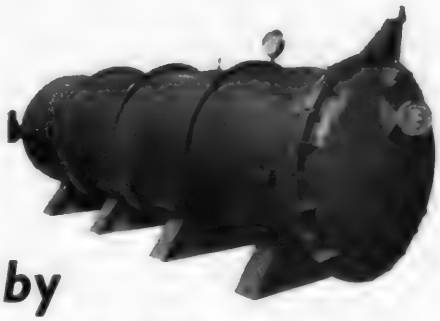

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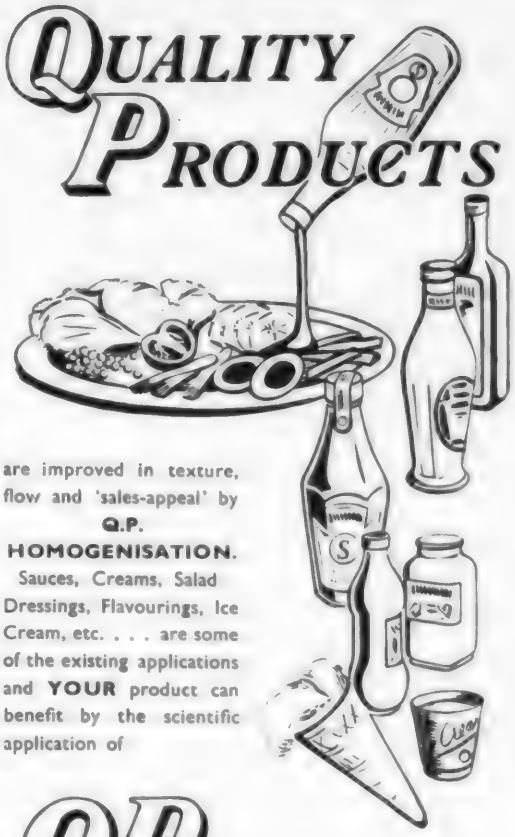

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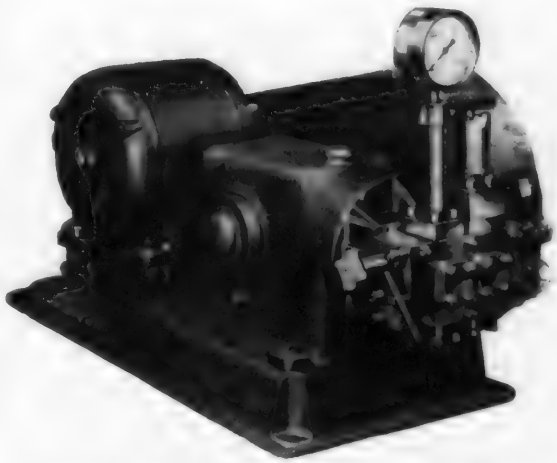

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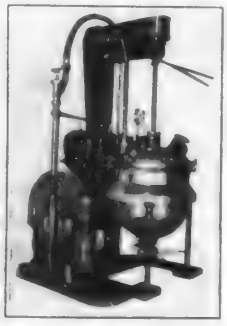

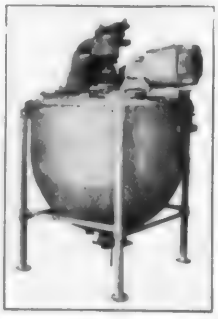

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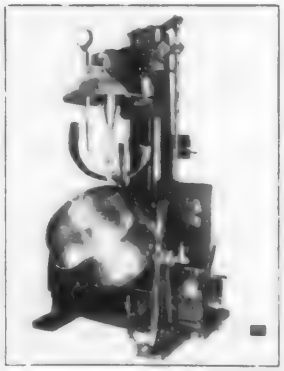

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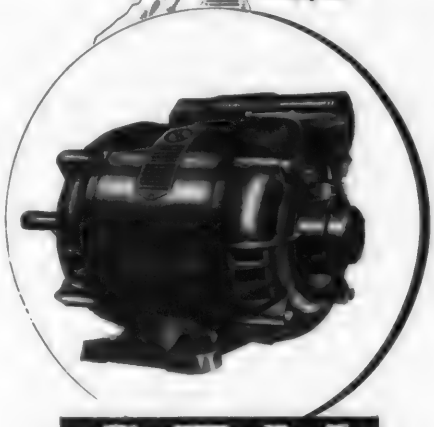

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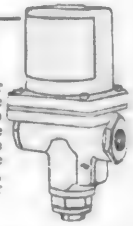

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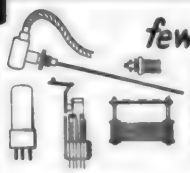

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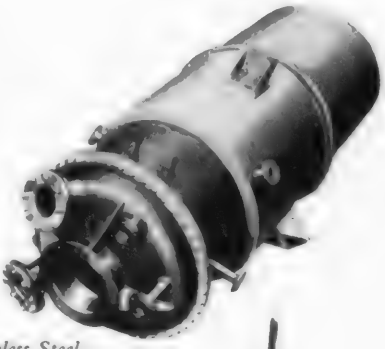

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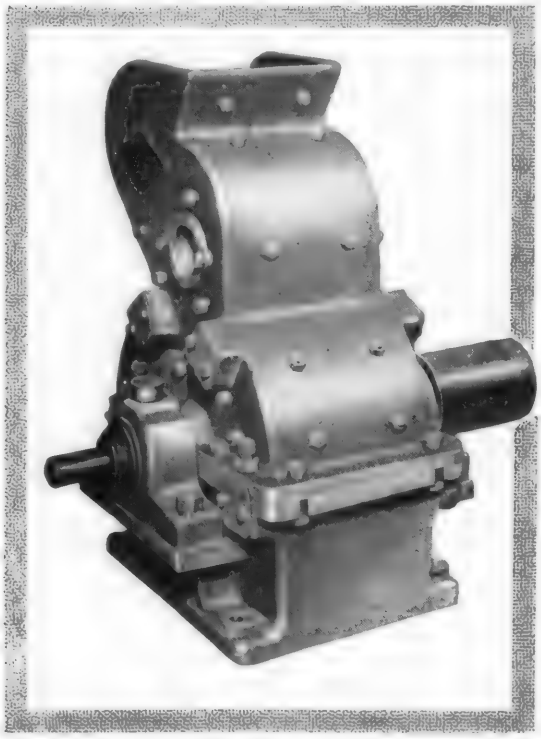

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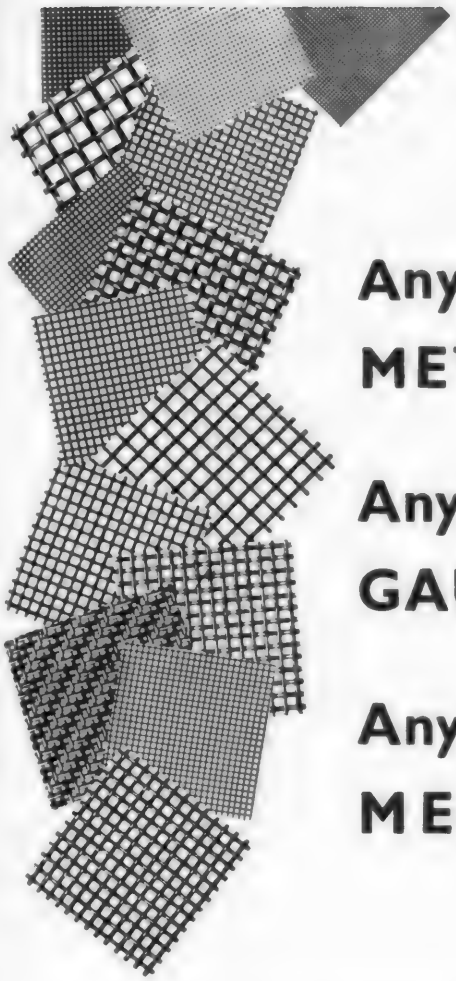

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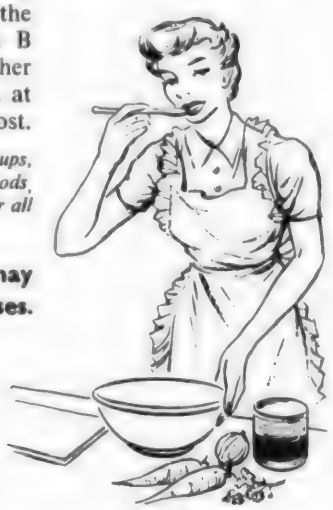

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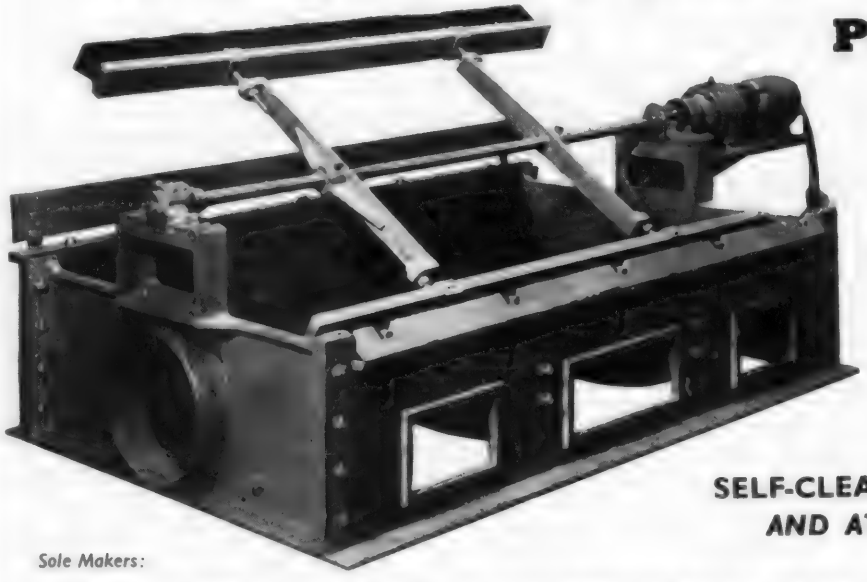

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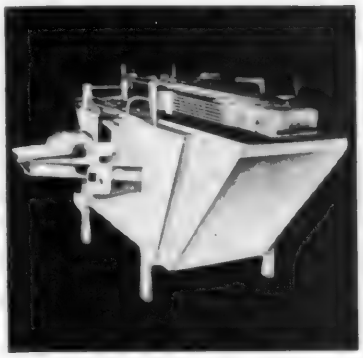

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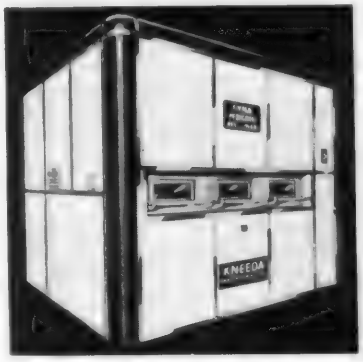

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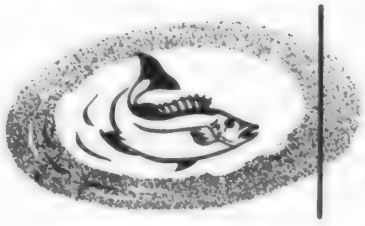

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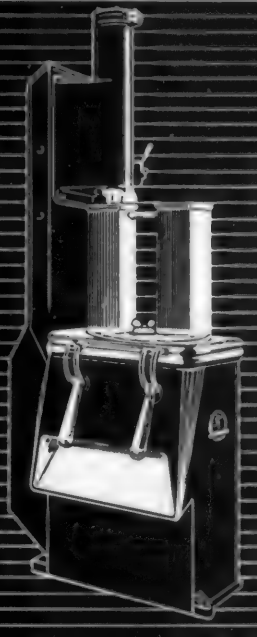

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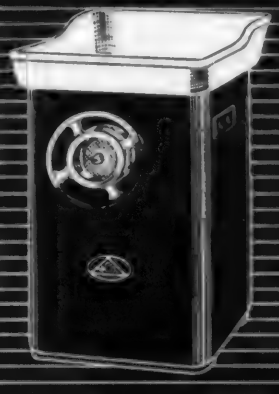

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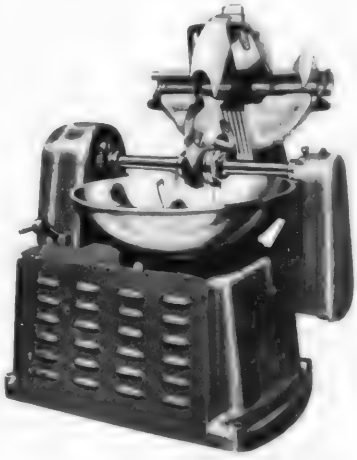

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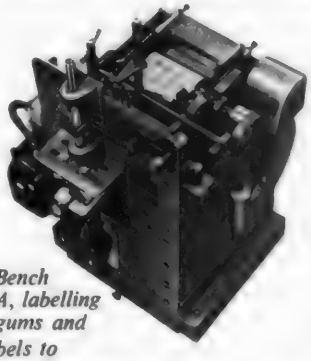

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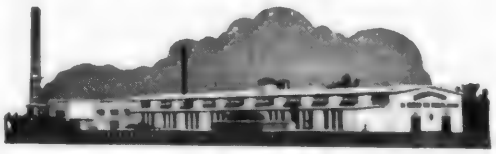

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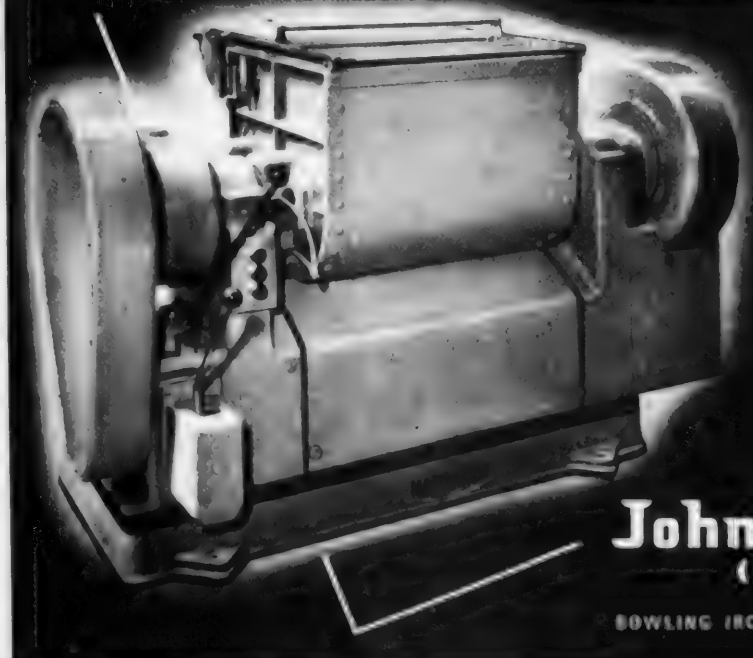

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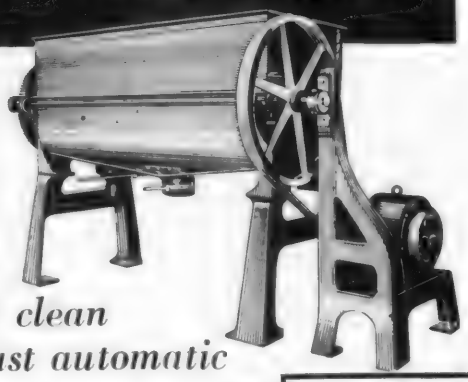

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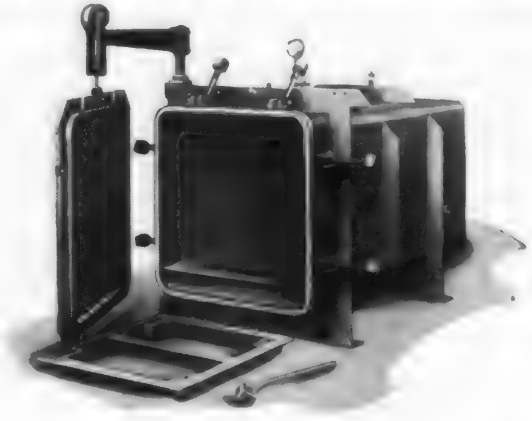

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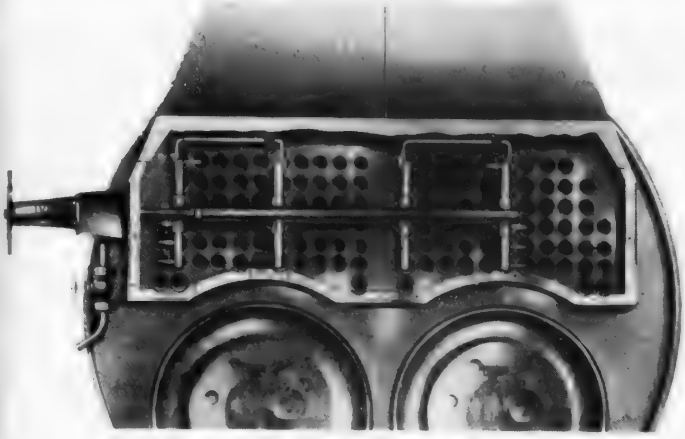

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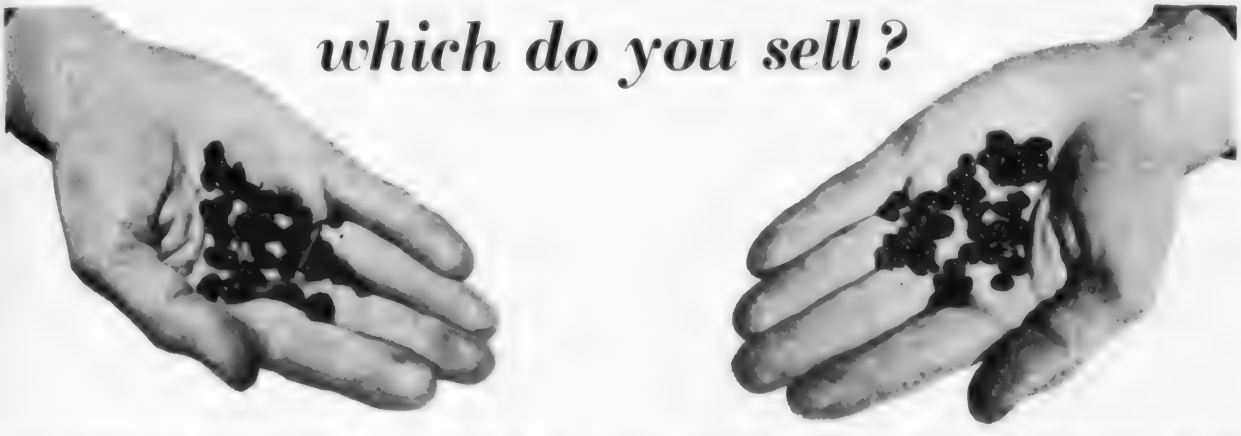

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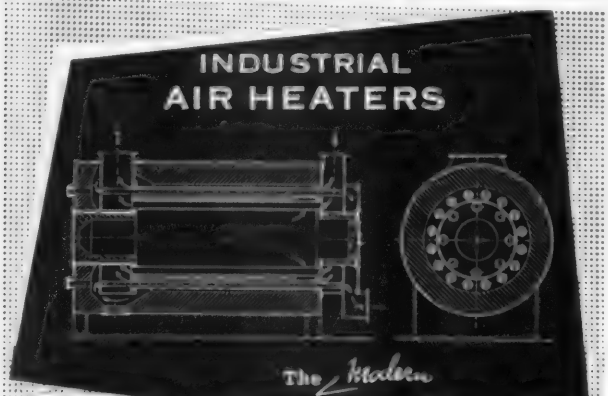

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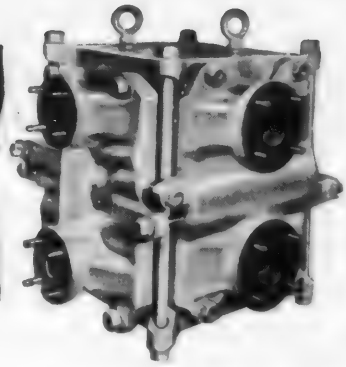

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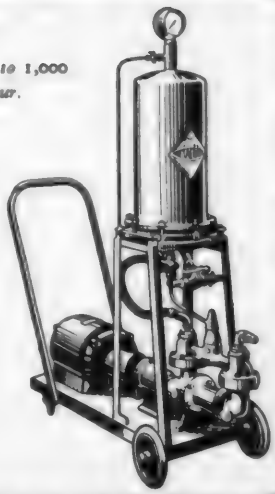

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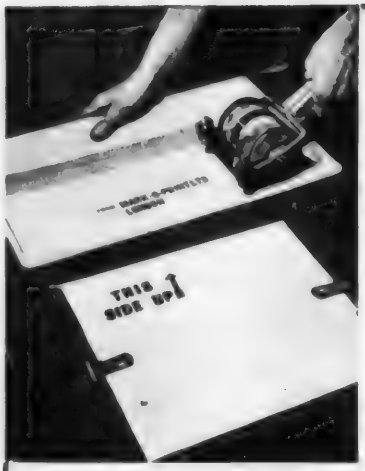

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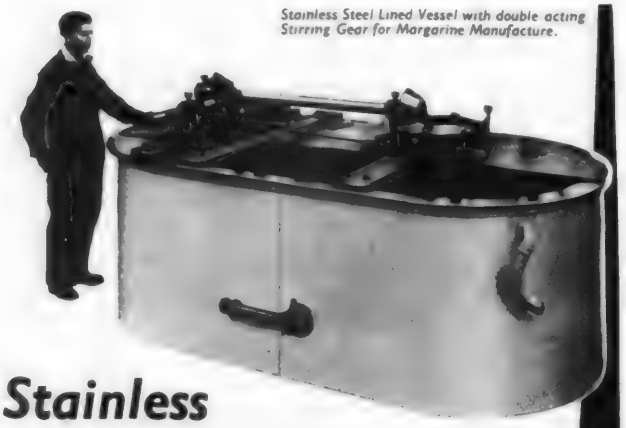

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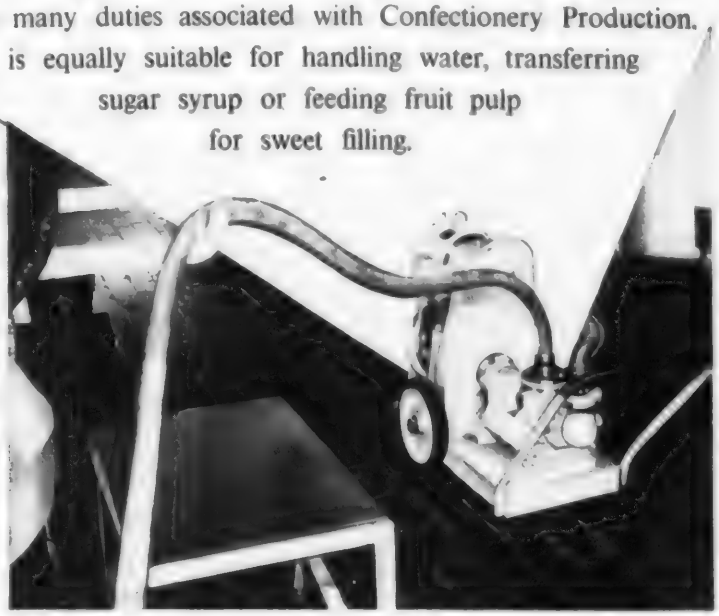

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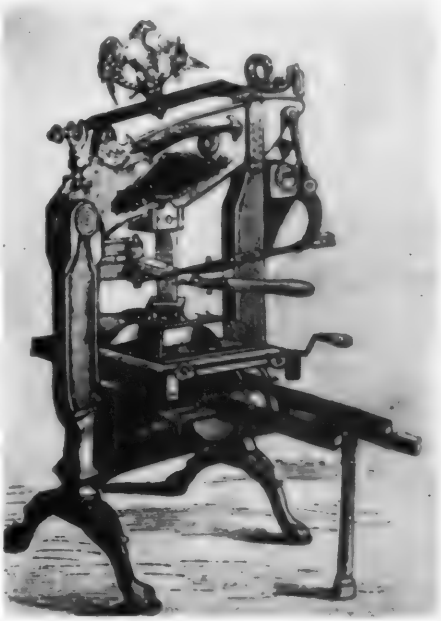

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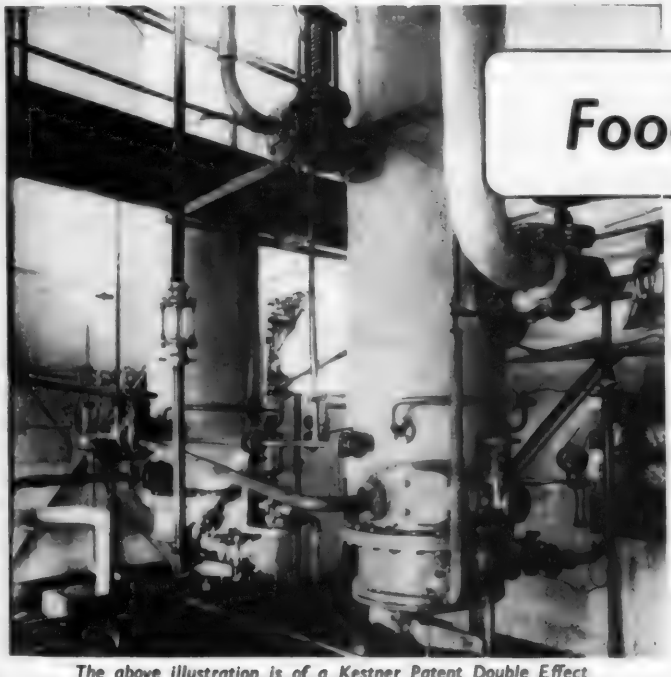

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We wish to purchase a Food Processing or Canning Company with tax losses. If Company is not at present operating please state date it ceased. Full particulars in strictest confidence to Box B5136.

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VACUUM DRYING CAPACITY

preferably on continuous production machine.

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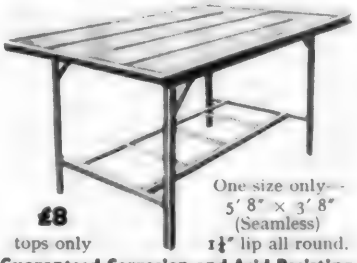
Table-tops or Trays in STAINLESS STEEL (Firth's Qual.)



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ONE 1951 Southall and Smith Automatic Weighing Machine, 15 units per minute. In good working order.—G. F. Lovell and Co. Ltd., Rexville, Newport, Mon.

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Jac. Mixing Pans, 40, 60, 75, 85, 100, 150 and 200 gall. Copper jac. Pans, 20, 30, 40 and 80 gall. Twenty "Z" and Fin Blade Mixers up to 38 in. by 28 in. by 31 in. Ten "U" Trough Mixers and Sifter/Mixers up to 7 ft. 6 in. by 3 ft. by 3 ft. Bowl Mixers, 10, 20, 30 and 80 qt. 2,400 gall. glass lined cyl. enc. Tanks. 3,350 gall. aluminium cyl. open Tank. Cooling Roll, 9 ft. by 4 ft. diam. Jac. Vacuum Ovens, 8 ft. by 5 ft., 8 ft. by 4 ft., 7 ft. by 3 ft. 6 in. and 6 ft. by 3 ft. 6 in. Steam Retorts, 6 ft. by 3 ft. by 3 ft., 10 lb. w.p. Autoclaves and Digestors up to 3,250 gall. Pulverizers, disintegrators, crushers, refiners, hydros, pumps, boilers, condensers, elevators, roller conveyor, etc.—Harry H. Gardam and Co. Ltd., Staines.

MARMALADE and Preserving Plant for Sale. Kellie and Whites Quartering, Peeling and Separating Machines, belt and motor drive. B.C.H. "Turnbull" Peel Chipping Machine with stainless steel working parts and automatic belt feed. B.C.H. "Speedy" Drained Peel Cutting Machine with stainless steel working parts. B.C.H. 15-in. and 8 in. diam. stainless steel Pulping Machines. B.C.H. 40-gall. copper tilting steam jacketed Boiling Pans. Duckworth automatic Jam Filling Machine. Swallow 25-in. diam. latest type motorised Bowl Chopping Machine. Alite Mincemeat Filling Machine. B.C.H. stainless steel and copper Jam Bogeys. Purdy automatic and semi-automatic Bottle Labelling Machines.—C. Skerman and Sons Ltd., 118, Putney Bridge Road, London, S.W.15. Tel.: Vandyke 2406.

THREE Ramsden stainless steel tilting steam jacketed Boiling Pans, approximately 50-gall. capacity, suitable for 70 lb. and 100 lb. steam working pressure.—Details from Box B5141.

AUTOMATIC Vacuum Jar Capping Machine by Duckworth, for 1 and 2-lb. jars. Fitted with motor drive and slat conveyor. Capacity 53 jars per minute. Almost new.—Apply Box B5142.

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TWO excellent Gardner 5-cwt. size Combined Sifting and Mixing Machines, and one 3-cwt. size. One revolving drum-type Horizontal Mixer, 3 ft. 9 in. long, 6 ft. 4 in. diam., and 7 h.p. A.C. motor. Can be used for tea, dry powders, granular materials, seeds, etc.,—Frank Stacey and Co. Ltd., Vauxhall Street, Birmingham, 4.

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MARZIPAN Toaster for Gas, water cooling; 3-Granite roll Refiner, rolls 28 in. by 14 in., perfect; 50-gall. Aluminium enclosed Mixing Vessel; 4-speed 60-80 qt., 230 a.c. Mixer; Roberts small-bottle Filling Machine; UNO Coffee Roaster; 4 heavy Hand Copper Boiling Pans; Chocolate Drop Press.—Box B5144.

TWO Bertram Twin Roll Driers, rolls 80 in. by 28 in. diam., 80 lb. w.p., with conveyors, fume hoods, elevator and powder dresser.—Reply: George Cohen Sons and Co. Ltd., Wood Lane, London, W.12, Tel.: Shepherds Bush 2070, and Stanningley, near Leeds, Tel.: Pudsey 2241.

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HOMOGENISERS, several sizes, also stainless steel Tanks, good condition.—Box B5101.

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250 AND 500 gall. stainless steel Tanks with agitators; Benhil Butter and Margarine Packer; Pasteuriser; Ovens; Mixers; Kneaders, etc.—Your enquiries welcomed. Sorensen Bakery Equipment Ltd., 42, Raby Street, Manchester, 16. Tel.: Moss Side 2054. 'Grams: Rahbek.

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COMPLETE Vacuum Drying Plant by Scott, comprising horiz. band drier, approx. 35 ft. by 6 ft., with service feed hoppers, shaker feeder, condensate receivers for hotplates, vacuum augmentor, kek mill, screening and finished material hoppers, tailings elevator, wet and dry vacuum pumps. Powered by flame-proof motors. Drier of the seven-band type, but has operated with three bands only. Patent Tubular Drier by R. Simon, approx. 14 ft. by 6 ft. by 6 ft., c.i. constr. on glazed base. Revolving reel agitator of solid drawn steel tubes, suitable 60/80 lb. sq. in. w.p. Motorised 12½ h.p. 415/3/50. Separate belt drive to No. 4 Sturtevant extractor fan, feed hopper included.

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HOBART, Peerless and Melvin Bowl Mixers, 80-quart and 20-quart bowls, motorised. "Artofex" Kneading Machine 1½-sack bowl. "Crollie" Mixer, Elevator and Sifter, combined. Copper Mixing Pan, steam-jacketed, by BCH, size 19 in. by 16 in. by 24 in. deep, 3 in. outlet. "Premier" Emulsifier, stainless, motorised. Bottle Filling Machines for vacuum operation, with stainless contact parts. Vacuum Pumps 5 in. by 8 in. str., 2-cyl.—Welding's, Saxone Bdgs., Tarleton Street, Liverpool, 1.

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Duties up to 450 g.p.m.

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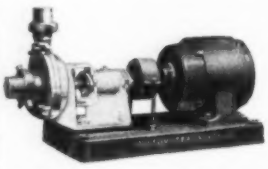

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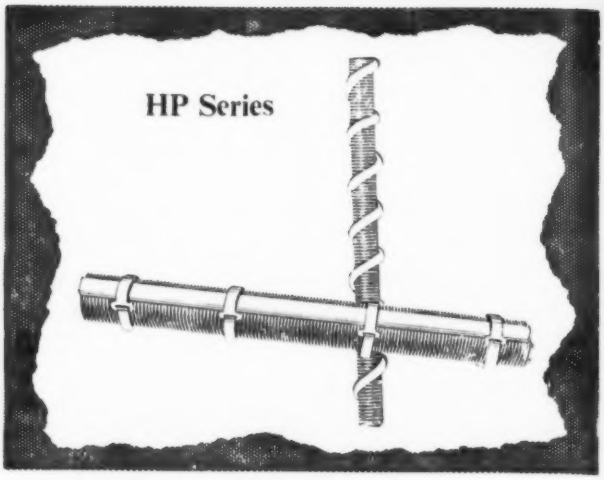

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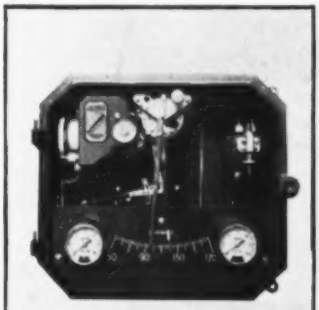
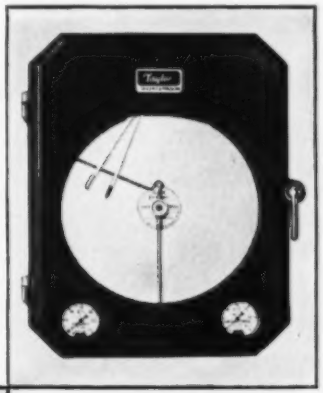
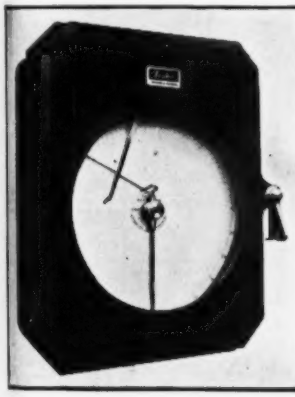
FULSCOPE INDICATING TEMPERATURE CONTROLLER
Especially useful where chart record is not necessary or where Recording Thermometer is already in use. Controls temperature within very close limits.

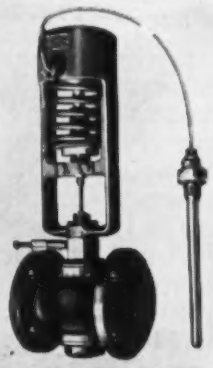


FULSCOPE RECORDING TEMPERATURE CONTROLLER
This instrument automatically regulates temperature and provides a written record of entire cooking process. It can be used in storage rooms, cooling canals, open tanks, retorts, sterilizers, blanchers and continuous cooker coolers.



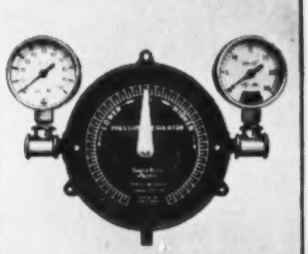


RECORDING THERMOMETER
Especially valuable on exhausters, lye peelers, retorts and cookers where a written record is important. Gives accurate, minute-by-minute written record from which any irregularity can be quickly detected.



SELF-ACTING TEMPERATURE CONTROLLER
This instrument offers both quick response and dependability. Most often used on open tanks, peelers, sterilizer and hot water tanks. Double-seated, quick-opening valves are standard. Screwed or flanged connections.

NON-INDICATING PRESSURE CONTROLLER
Especially useful on cookers, coolers, steam lines, etc. Air operated, it may be used on direct or back pressure applications.



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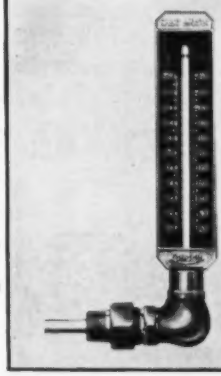

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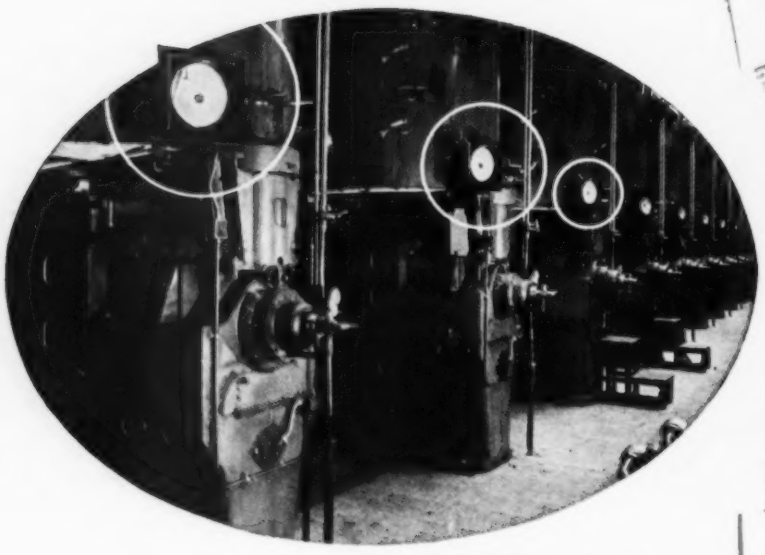
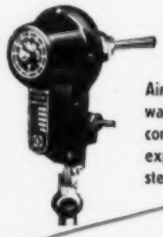
... whichever is the best automatic for process control



Air-operated recorder regulators controlling food processing plant.

Air operated controllers with or without recording feature.



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